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United States
Department of
Agriculture

Soil
Conservation
Service

Bozeman,
Montana



Montana Water Supply Outlook

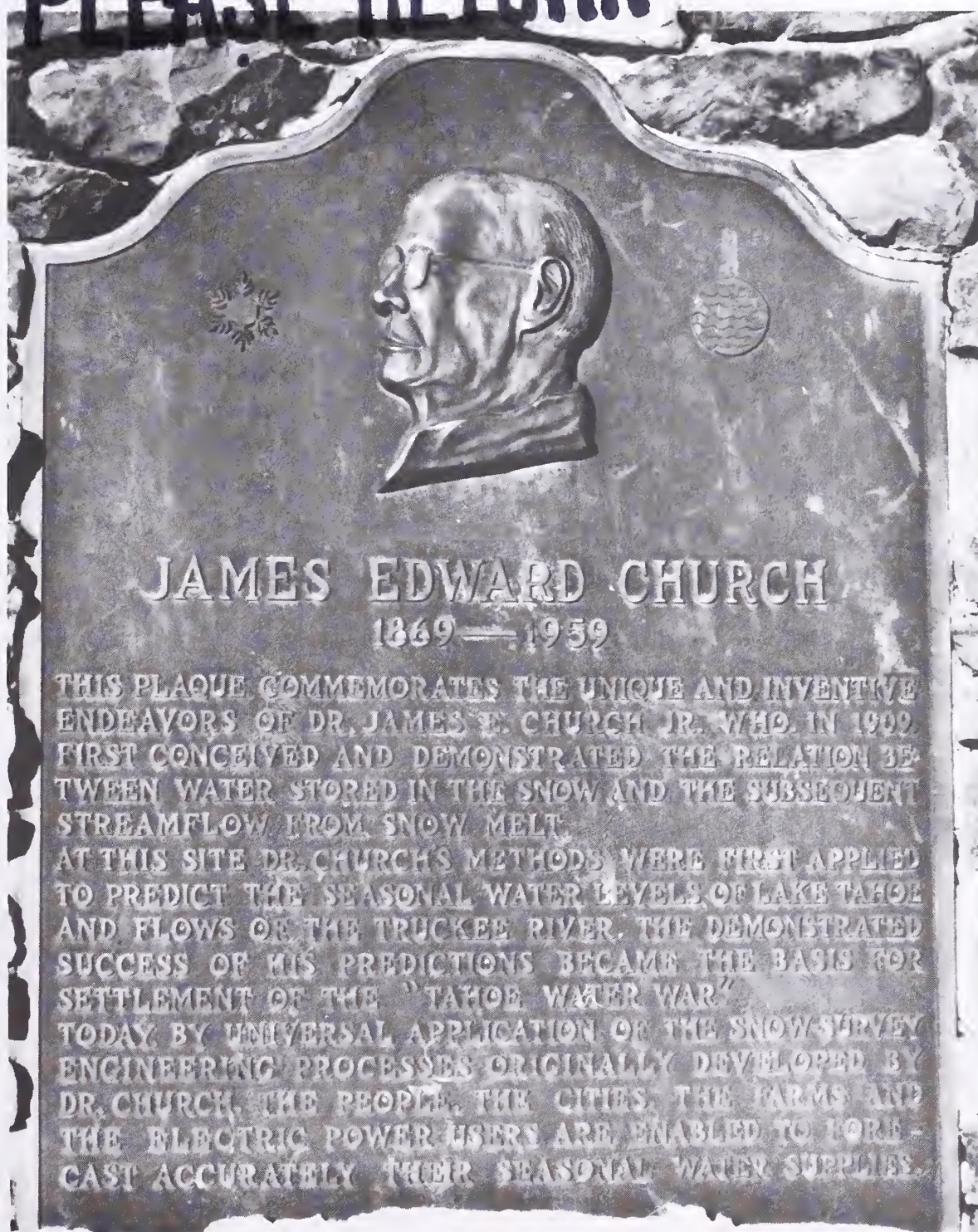
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JAMES EDWARD CHURCH
1869 — 1959

THIS PLAQUE COMMEMORATES THE UNIQUE AND INVENTIVE ENDEAVORS OF DR. JAMES E. CHURCH JR. WHO IN 1902 FIRST CONCEIVED AND DEMONSTRATED THE RELATION BETWEEN WATER STORED IN THE SNOW AND THE SUBSEQUENT STREAMFLOW FROM SNOW MELT.

AT THIS SITE DR. CHURCH'S METHODS WERE FIRST APPLIED TO PREDICT THE SEASONAL WATER LEVELS OF LAKE TAHOE AND FLOWS OF THE TRUCKEE RIVER. THE DEMONSTRATED SUCCESS OF HIS PREDICTIONS BECAME THE BASIS FOR SETTLEMENT OF THE "TAHOE WATER WAR".

TODAY BY UNIVERSAL APPLICATION OF THE SNOW-SURVEY ENGINEERING PROCESSES ORIGINALLY DEVELOPED BY DR. CHURCH, THE PEOPLE, THE CITIES, THE FARMS AND THE ELECTRIC POWER USERS ARE ENABLED TO FORECAST ACCURATELY THEIR SEASONAL WATER SUPPLIES.



Foreword

How Forecasts Are Made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply outlook conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via radio telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

An error is associated with each forecast, and this error decreases as the season progresses and more data becomes available. To express the range of error that can be expected, "most probable" forecasts are issued along with a range representing a "reasonable minimum" and a "reasonable maximum". Actual streamflow can be expected to fall within this range in eight out of ten years. Additionally two specific scenarios are provided based on the assumption that subsequent precipitation will be "wet", above average, or "dry", below average.

For More Information

Copies of Monthly Water Supply Outlook Reports and other reports may be obtained from the states listed below. An annual snow survey data summary is published by the Soil Conservation Service for each of the western states. Historical snow survey data may be obtained at those same offices.

STATE	ADDRESS
Alaska	201 East 9th Ave., Suite 300, Anchorage, AK 99501-3687
Arizona	201 East Indianola Ave., Suite 200, Phoenix, AZ 85012
Colorado	2490 West 26th Ave., Building A, 3rd floor, Denver, CO 80211
Idaho	3244 Elder Street, Room 124, Boise, ID 83705
Montana	10 East Babcock, Room 443, Federal Building, Bozeman, MT 59715
Nevada	1201 Terminal Way, Room 219, Reno, NV 89502
New Mexico	517 Gold Ave. S.W., Room 3301, Albuquerque, NM 87102-3157
Oregon	1220 Southwest 3rd Ave., Room 1640, Portland, OR 97204
Utah	4402 Federal Building, 125 South State Street, Salt Lake City, UT 84147
Washington	W. 920 Riverside, Room 360, Spokane, WA 99201-1080
Wyoming	Federal Building, 100 "B" Street, Room 3124, Casper, WY 82601

In addition to state reports, a Water Supply Outlook for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

Water supply reports published by other agencies:

California — Snow Survey Branch, California Department of Water Resources, P.O. Box 388, Sacramento, CA 95802; British Columbia — The Ministry of Environment, Water Investigations Branch, Parliament Buildings, Victoria, British Columbia, V8V 1X5; Yukon Territory — Department of Indian and Northern Affairs, Northern Operations Branch, 200 Range Road, Whitehorse, Yukon Territory, Y1A3V1; Alberta, Environment Technical Services Division, 9820 106th St., Edmonton, Alberta T5K 2J6.

Montana Water Supply Outlook

and

Federal - State - Private Cooperative Snow Surveys

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ON THE COVER:

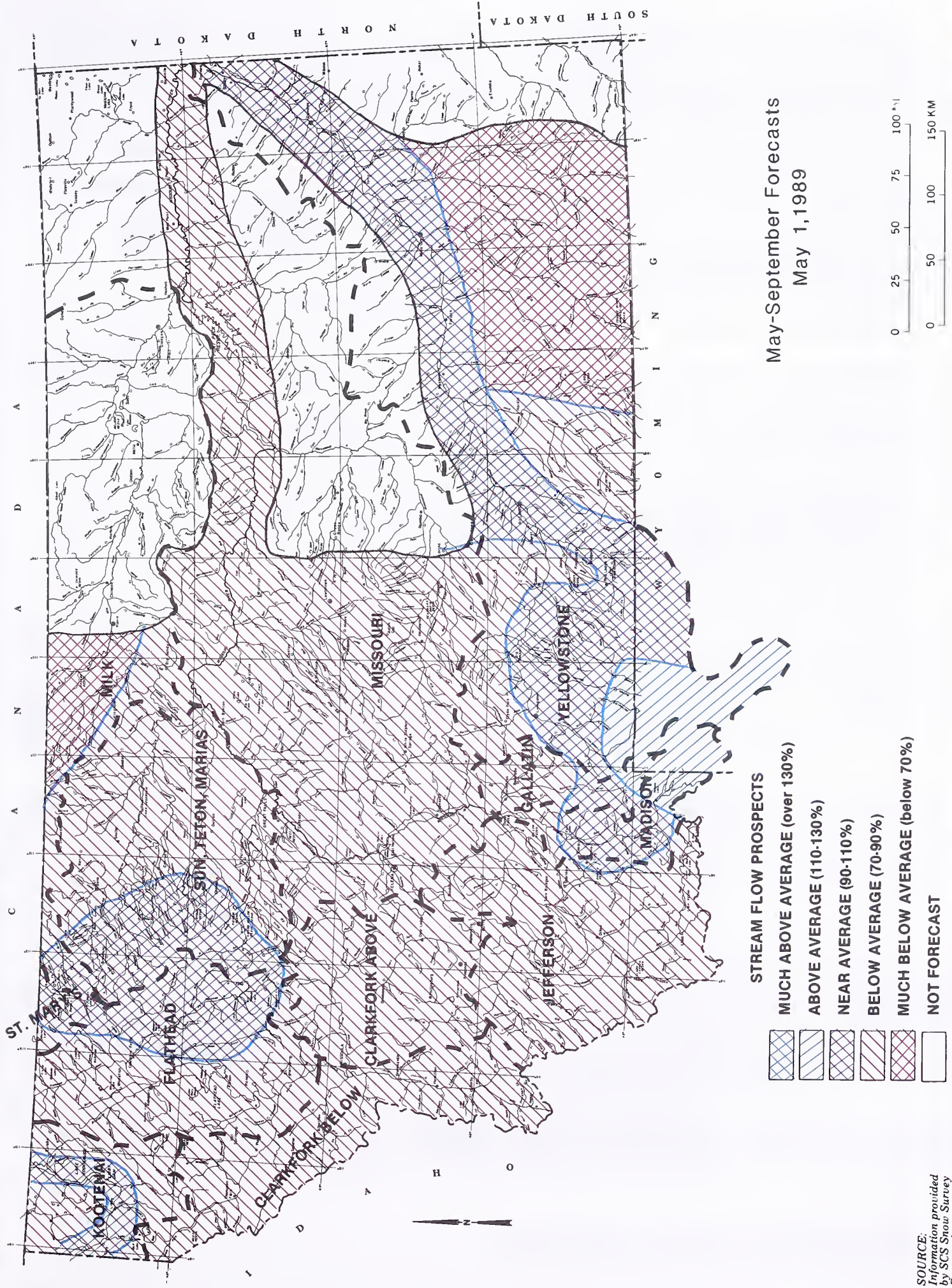
This plaque on the outlet gate at Lake Tahoe, Nevada, commemorates the start of snow surveys in 1909.

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STREAMFLOW PROSPECTS FOR MONTANA

Spring and Summer Period



SOURCE:
Information provided
by SCS Snow Survey
Personnel.

General Outlook

Hydrologic Effect of 1988 Fires - Update

As more accurate acreage and burn intensity values are obtained, estimates of increases in spring runoff are being revised.

Based on data currently available, the following increases are projected for the affected forecast points included in this report.

Location	% Drainage burned*	% Increased Runoff May-Jul	% Increased Runoff May-Sep
Clark Fork above Missoula • Lower Willow Creek Resv. Inflow	9	6	6
Madison • Madison River near Grayling	31	14	13
Gallatin • Gallatin River near Gateway	3	2	2
Sun-Teton-Marias • Sun River at Gibson Dam	7	2	2
Yellowstone • Yellowstone River at Lake Outlet	19	9	8
• Yellowstone River at Corwin Springs	24	9	9
• Stillwater River near Absarokee	5	2	2
• Clarks Fork River near Belfry	9	4	4

* Only considers timbered areas with canopy burn.

Summary

April brought quite varied conditions across Montana. April mountain precipitation was near to above average in the Yellowstone, Clark Fork above Missoula, Missouri Main Stem, Sun, Marias, Teton and St. Mary River Basins and below average elsewhere. April runoff was above average over most the State except for below average flows in the southwest drainages. Snowmelt and below average snowfall reduced snowpack percentages from those of earlier months. Most areas now have snowpacks in the 75 to 90 percent of average range. May through September runoff is forecast to be 75 to 90 percent of average from most Montana drainages. Near to above average runoff is expected from drainages in and near Yellowstone National Park. Peak snowmelt runoff is expected to occur near normal dates and at near or a little below average levels.

Snowpack

The snowpack is below average over most of the State. The only areas with near average snowpack are the Flathead, Swan, Yellowstone in and near Yellowstone National Park, and the Upper Madison drainages. The Snowy Mountains in Montana and the Little Bighorn, Wind, Tongue and Powder River drainages in Wyoming all show much below average snowpacks. Statewide almost all drainages showed a decrease in snowpack percentages from April 1 levels due to above average snowmelt rates. Low elevation snow in most areas has melted.

See Page 33 for future status of this report

Precipitation

Mountain precipitation was generally below average in the western and southwestern watersheds, near average in the Upper Clark Fork and Yellowstone drainages, above average east of the Continental Divide and west of Great Falls. Much of the moisture that occurred near the end of April fell as rain.

Reservoirs

Reservoir storage varies across the State. Many have near to above average storage levels while some still have below normal storage. With current and projected runoff, most reservoirs are expected to fill this season. Many operators of smaller reservoirs will be filling their structures with early runoff this year as they remember the last few dry years. Some will then need to pass the peak flows through the system which could cause some problems downstream.

Streamflow

Runoff during April was above average over most the State due to above average mountain precipitation and snowmelt. The Jefferson, Lower Madison, Gallatin, Missouri Basin tributaries in central Montana and most drainages flowing from Wyoming, east of Yellowstone National Park, had below average flows. Forecasts for May through September runoff are for 75 to 90 percent of average over most of the State. Headwaters of the Marias and St. Mary Rivers should produce a little below average runoff. Headwaters of the Yellowstone and Madison Rivers in Yellowstone National Park are projected to have above average runoff. Other streams with headwaters in or near the Park should have near average streamflows.

Soil Moisture

Most soil moisture levels have improved as a result of snowmelt and rainfall absorption. However, there still appears to be some moisture shortages in the deeper zones in most areas below the snowline.

Peak Flows

Estimates of peak snowmelt flow ranges for unregulated streams are shown on Page 32.

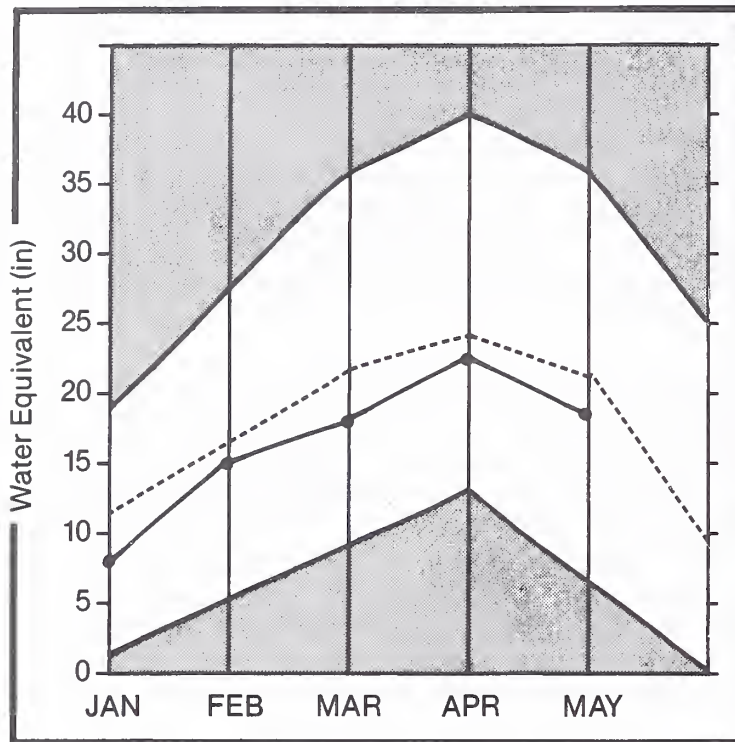
The lower range is representative of the maximum daily flows that would occur from snowmelt with little rainfall during that period. The higher range could be expected with moderate amounts of rain about the same time as maximum snowmelt runoff is occurring. It appears the peak snowmelt runoff will occur near normal time if spring temperatures are near normal.

Based on current snowpack levels, most tributary streams to the Kootenai River are expected to have peak snowmelt runoff in early May. Lower elevation streams, west of the Divide, should peak near mid-May while larger streams with higher elevations should peak near the end of May. Most streams in southwest Montana and those in the Sun, Teton, Marias and St. Mary River Drainages are expected to peak in late May or early June. The Beaverhead River could be a few days earlier.

Higher elevation basins such as the Gallatin, Yellowstone and most of the major tributaries to the Yellowstone are expected to peak around mid-June.

Kootenai Basin

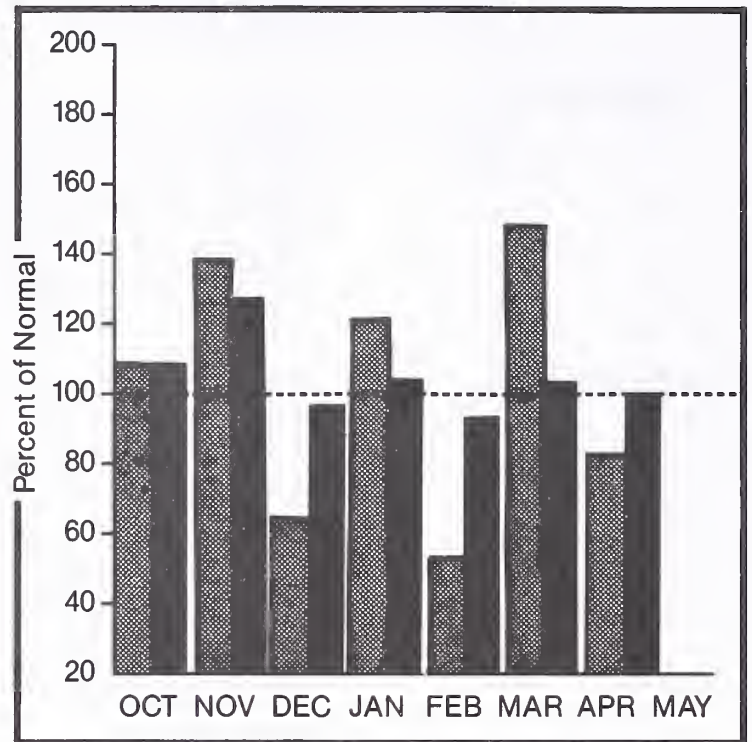
Mountain snowpack* (inches)



*Kootenai in Montana

Maximum  Average 
Minimum  Current 

Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation  Year to date precipitation 

Water Supply Outlook

Mountain precipitation was below average for April. Snowpacks have decreased somewhat over the entire Basin including Canada and are now slightly below average. April streamflows were much above average. Spring and summer streamflow forecasts are expected to be below average on the Kootenai River and well below average on smaller tributaries that flow into the Kootenai River. Peak snowmelt runoff on streams that flow into the Kootenai River is expected to occur in early May.

For more information contact your local Soil Conservation Service Office.

KOOTENAI RIVER BASIN in Montana

STREAMFLOW FORECASTS

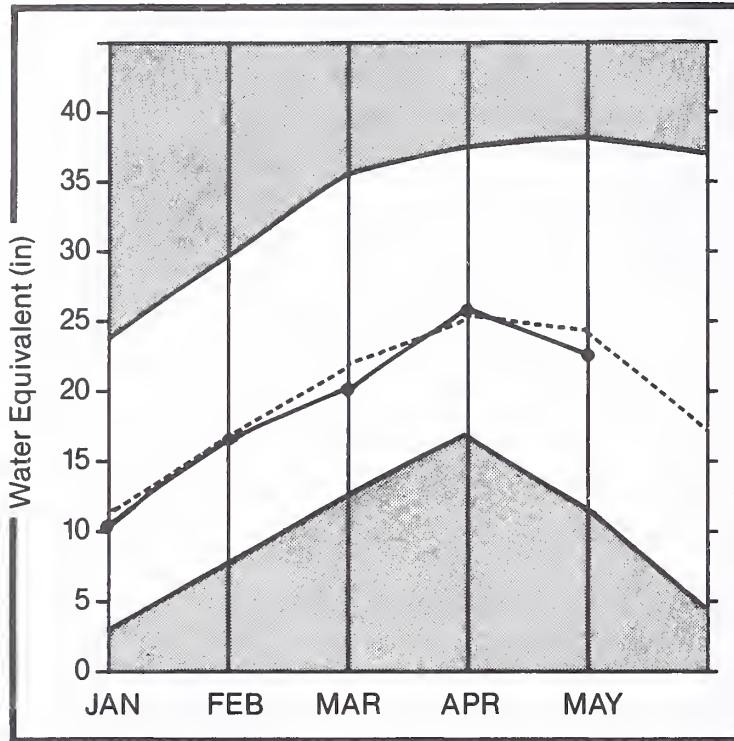
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
KOOTENAI b1 Libby Dam (2)	MAY-JUL MAY-SEP	5190 6170	95 96			6110 7270	4270 5070	5438 6456
FISHER nr Libby	MAY-JUL MAY-SEP	120 135	69 71	129 143	111 127	170 139	70 131	173 189
YAAK nr Troy	MAY-JUL MAY-SEP	290 310	74 75	300 320	280 305	385 410	196 210	391 414
KOOTENAI at Leona (2)	MAY-JUL MAY-SEP	6200 7290	94 95			7450 8750	4950 5830	6585 7685

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
LAKE KOOCANUSA	5748.0	1742.0	1648.0	1932.0	EAST KOOTENAI in B.C.	25	131	99
					KOOTENAI in MONTANA	30	153	87
					KOOTENAI ab BONNERS FERRY	55	143	92

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
 REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
 (1) - REAS. MAX. and REAS. MIN. forecasts are for 5% and 95% exceedance levels.
 (2) - Corrected for upstream diversions or changes in reservoir storage.

Flathead Basin

Mountain snowpack* (inches)



*Flathead

Maximum



Minimum



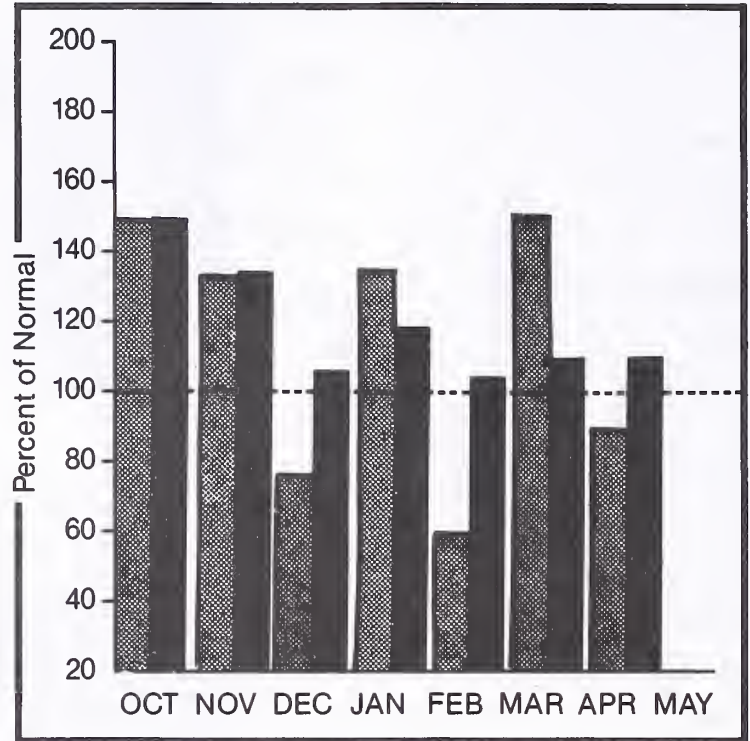
Average



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

April precipitation was a little below average in the mountains. Snowpack levels decreased a little during the month and are now near average. Snowpack in the Little Bitterroot Drainage is below average. April runoff was well below average. Streamflows are forecast to be in the 85 to 90 percent of average range for the spring and summer period. Peak snow-melt runoff at most forecast points should occur during the last week of May and is expected to be near to a little below average.

For more information contact your local Soil Conservation Service Office.

FLATHEAD RIVER BASIN

STREAMFLOW FORECASTS

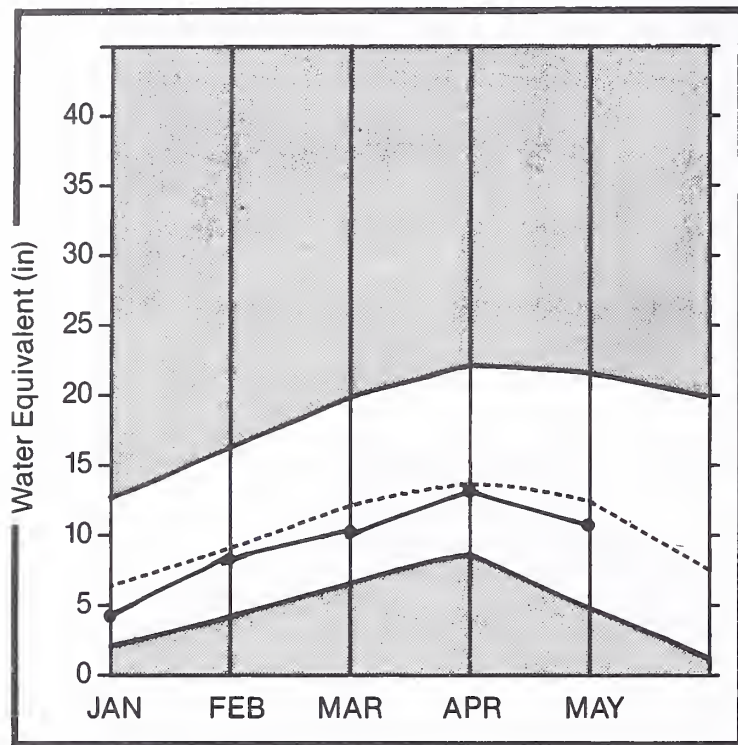
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
NF FLATHEAD nr Columbia Falls	MAY-JUL	1350	88	1460	1240	1610	1090	1528
	MAY-SEP	1520	89	1610	1400	1810	1230	1708
MF FLATHEAD nr West Glacier	MAY-JUL	1300	86	1350	1250	1590	1010	1513
	MAY-SEP	1450	87	1470	1430	1750	1150	1669
SF FLATHEAD nr Columbia Falls (1)	MAY-JUL	1700	91	1740	1660	2020	1380	1861
	MAY-SEP	1840	92	1860	1800	2160	1520	1998
FLATHEAD nr Columbia Falls (1)	MAY-JUL	4510	90	4510	4510	5360	3660	5016
	MAY-SEP	4980	90	5150	4810	5860	4100	5518
SWAN nr Bigfork	MAY-JUL	470	92	475	460	560	380	509
	MAY-SEP	555	93	560	545	660	450	595
FLATHEAD nr Polson (2)	MAY-JUL	5160	88	5340	4980	6090	4230	5834
	MAY-SEP	5700	89	5960	5440	6850	4550	6398

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
CAMAS (4)	45.2	19.9	19.7	28.4	NORTH FORK FLATHEAD	15	163	98
MISSION VALLEY (8)	100.0	40.3	36.3	49.7	MIDDLE FORK FLATHEAD	11	142	90
HUNGRY HORSE	3451.0	1527.0	1019.0	2040.0	SOUTH FORK FLATHEAD	13	151	93
FLATHEAD LAKE	1791.0	941.0	864.0	929.0	STILLWATER-WHITEFISH	9	191	86
					SWAN	11	145	93
					LITTLE BITTERROOT	8	483	70
					FLATHEAD	47	156	93

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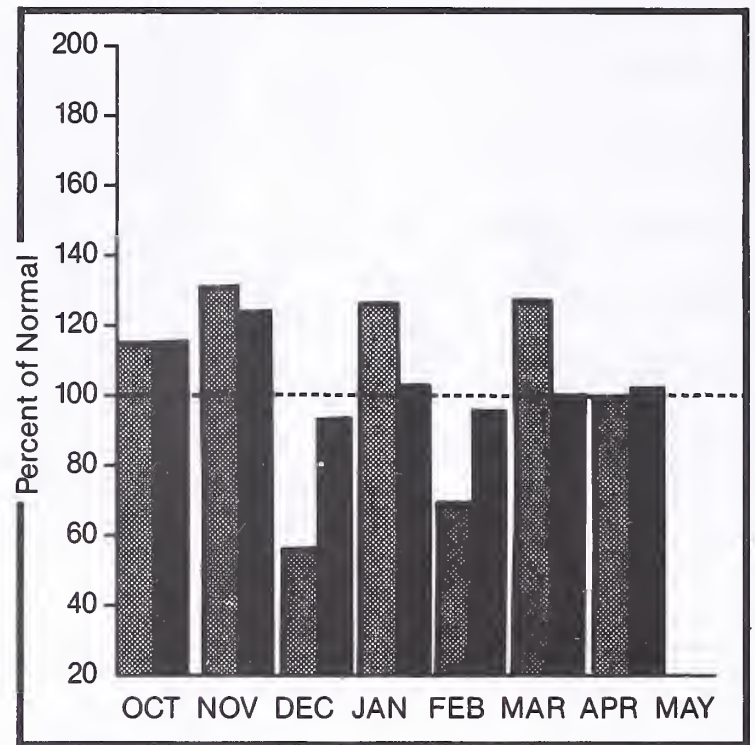
Clark Fork Basin above Missoula

Mountain snowpack* (inches)



*Clark Fork above Missoula

Precipitation* (percent of normal)



*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



Water Supply Outlook

April mountain precipitation was average for the Basin. The snowpack has been reduced to about 80 percent of average as a result of melt. Runoff during April was well above average in most drainages. Streamflow forecasts for the next five months are generally in the 70 to 85 percent of average range. Peak snowmelt runoff is expected to occur on most streams during the second or third week of May and should be close to or a little below average levels.

For more information contact your local Soil Conservation Service Office.

CLARK FORK RIVER BASIN above Missoula

STREAMFLOW FORECASTS

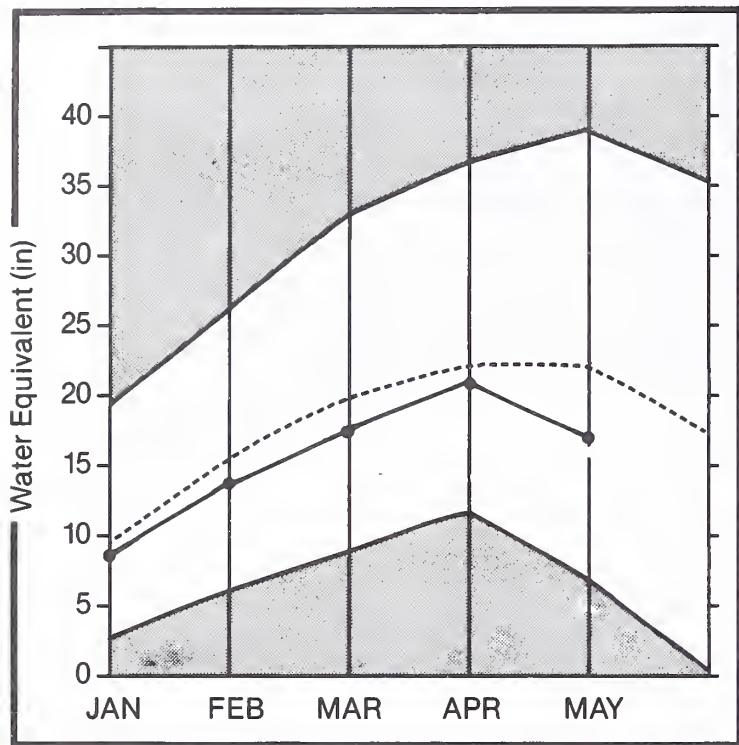
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MOULTON RESERVOIR inflow (2)	MAY-JUN	167	85	187	147	215	118	197
	MAY-JUL	188	85	210	168	245	133	222
WARM SPRINGS CK nr Anaconda (2)	MAY-JUL	28	80	30	26	37	19.2	35
	MAY-SEP	35	80	37	33	46	24	44
FLINT CK nr Southern Cross (2)	MAY-JUL	10.5	78	13.2	7.8	15.2	5.8	13.4
	MAY-SEP	12.9	79	15.9	9.8	18.6	7.2	16.4
FLINT CK bl Boulder Ck (2)	MAY-JUL	41	76	51	31	60	22	54
	MAY-SEP	54	77	65	44	79	30	70
LOWER WILLOW CK RES inflow (2)	MAY-JUL	9.0	72	10.6	7.4	13.4	4.6	12.5
	MAY-SEP	9.8	73	11.5	8.1	14.5	5.1	13.4
MF ROCK CK nr Philipsburg	MAY-JUL	52	80	56	49	67	37	65
	MAY-SEP	59	81	63	56	76	42	73
NEVADA CK nr Finn	MAY-JUL	14.0	82	14.9	13.1	19.9	8.0	17.0
	MAY-SEP	15.0	83	16.4	14.1	21	8.7	18.0
BLACKFOOT nr Bonner	MAY-JUL	670	88	710	630	815	525	760
	MAY-SEP	765	90	810	720	920	610	854
CLARK FORK ab Milltown (2)	MAY-JUL	515	86	575	455	725	305	597
	MAY-SEP	620	88	685	555	865	375	706
CLARK FORK ab Missoula	MAY-JUL	1200	88	1270	1090	1540	860	1357
	MAY-SEP	1390	89	1500	1280	1780	1000	1560

RESERVOIR STORAGE		(1000AF)			WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** THIS YEAR	USEABLE STORAGE LAST YEAR	** AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
GEORGETOWN LAKE	31.0	26.3	27.7	24.3	CLARK FORK ab BLACKFOOT	41	121	77
LOWER WILLOW CREEK	4.9	5.0	---	3.1	BLACKFOOT	16	150	89
NEVADA CREEK	12.6	12.2	4.6	10.2	CLARK FORK ab MISSOULA	52	127	80

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Clark Fork Basin below Missoula

Mountain snowpack* (inches)



*Bitterroot

Maximum



Average



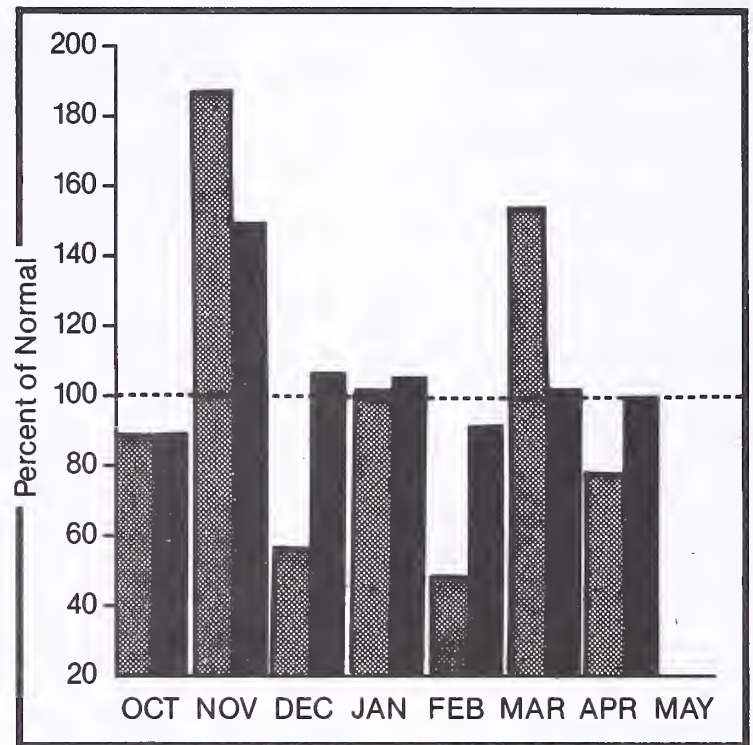
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

Mountain precipitation was below average across the Basin during April. Above normal melt and below average snowfall have reduced the snowpack to below average levels. Streamflows in individual drainages varied from near to much above average during April. Runoff for the May through September period is predicted to be in the 80 to 85 percent of average range. Both the Bitterroot and Clark Fork Rivers are expected to have peak snowmelt runoff near the end of May at near to a little below average levels.

For more information contact your local Soil Conservation Service Office.

CLARK FORK RIVER BASIN below Missoula

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
CLARK FORK ab Missoula	MAY-JUL MAY-SEP	1200 1390	88 89	1270 1500	1090 1280	1540 1780	860 1000	1357 1560
WF BITTERROOT nr Conner (2)	MAY-JUL MAY-SEP	110 130	81 83	125 146	95 114	144 169	76 91	135 156
BITTERROOT nr Darby	MAY-JUL MAY-SEP	395 435	84 84	435 470	355 405	515 555	280 315	470 519
ROCK CK nr Darby	MAY-JUL MAY-SEP	61 65	86 86			73 78	49 52	71 75
SKALKAHO CK nr Hamilton	MAY-JUL MAY-SEP	40 48	83 84	42 50	38 46	46 55	34 41	48 57
BURNT FORK CK nr Stevensville (2)	MAY-JUL MAY-SEP	25 30	83 86	26 31	23 28	34 39	16.0 21	30 35
BITTERROOT at Missoula (2)	MAY-JUL MAY-SEP	1050 1160	85 86	1100 1230	1000 1130	1250 1380	850 945	1239 1354
CLARK FORK bl Missoula	MAY-JUL MAY-SEP	2240 2540	87 87	2400 2690	2080 2390	2710 3060	1770 2020	2586 2914
CLARK FORK at St. Regis	MAY-JUL MAY-SEP	2900 3290	86 86			3580 4050	2220 2530	3379 3809
CLARK FORK nr Plains (2)	MAY-JUL MAY-SEP	8240 9270	86 87			9770 11000	6710 7570	9541 10621
THOMPSON nr Thompson Falls	MAY-JUL MAY-SEP	135 160	75 77	139 131	131	178 205	92 116	180 209
PROSPECT CK at Thompson Falls	MAY-JUL MAY-SEP	70 77	69 70	70 77	69 77	89 97	51 57	101 110
CLARK FORK at Whitehorse Rapids (2)	MAY-JUL MAY-SEP	9110 10200	86 87			10500 11700	7740 8670	10538 11764

RESERVOIR STORAGE

(1000AF)

WATERSHED SNOWPACK ANALYSIS

RESERVOIR	USEABLE CAPACITY	** THIS YEAR	USEABLE STORAGE LAST YEAR	** AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	AVERAGE
PAINTED ROCKS LAKE	31.7	0.0	17.7	21.0	CLARK FORK ab MISSOULA	52	127	80
NOXON RAPIDS	335.0	318.2	275.6	186.3	BITTERROOT	24	116	76
COMO	34.9	24.2	18.2	19.4	LWR CLARK FK bl MISSOULA	23	135	78
					BITTERROOT & LWR C.F.	45	126	77
					CLARK FORK TOTAL	91	126	78
					FLATHEAD	46	156	93
					PEND OREILLE	132	137	83

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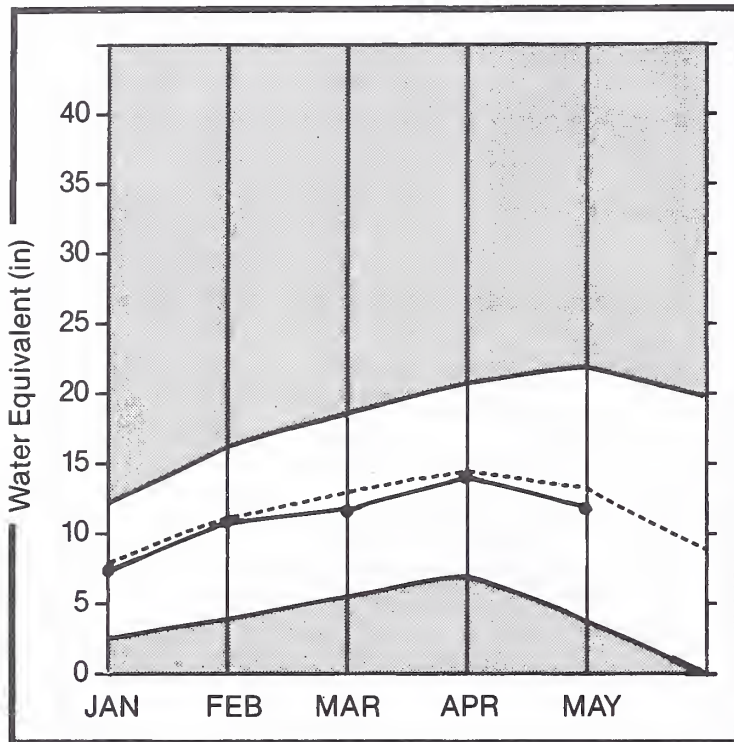
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(2) - Corrected for upstream diversions or changes in reservoir storage.

Jefferson Basin

Mountain snowpack* (inches)



* Jefferson

Maximum



Minimum



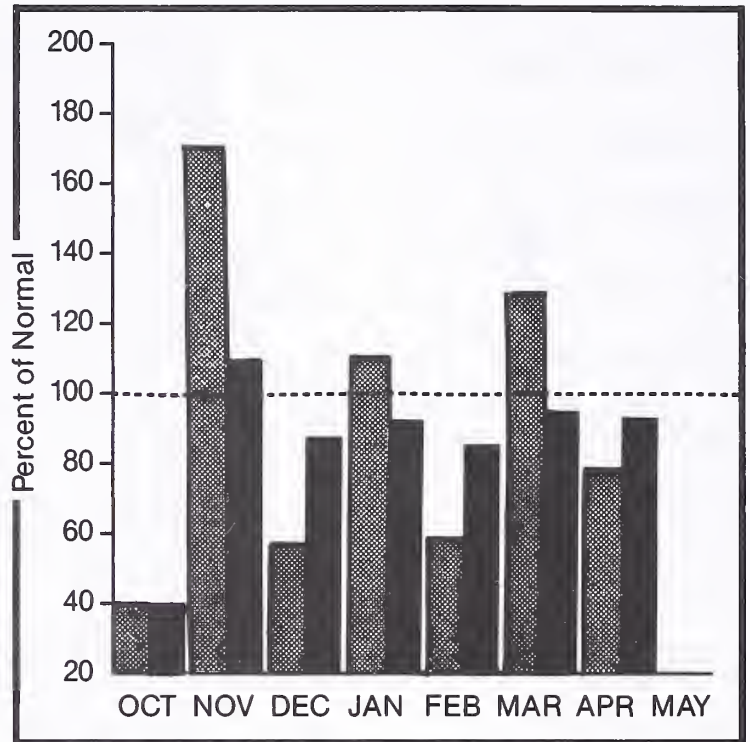
Average



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

During April, precipitation across the mountains was below average. Due to melt and below average snowfall, the snowpack percentages decreased and are now below average. Runoff during April was also below average on most drainages. Spring and summer streamflows are forecast to be in the 70 to 90 percent of average range. The peak snowmelt runoff is expected to occur in the third or fourth week of May and should have a little below average levels.

For more information contact your local Soil Conservation Service Office.

JEFFERSON RIVER BASIN

STREAMFLOW FORECASTS

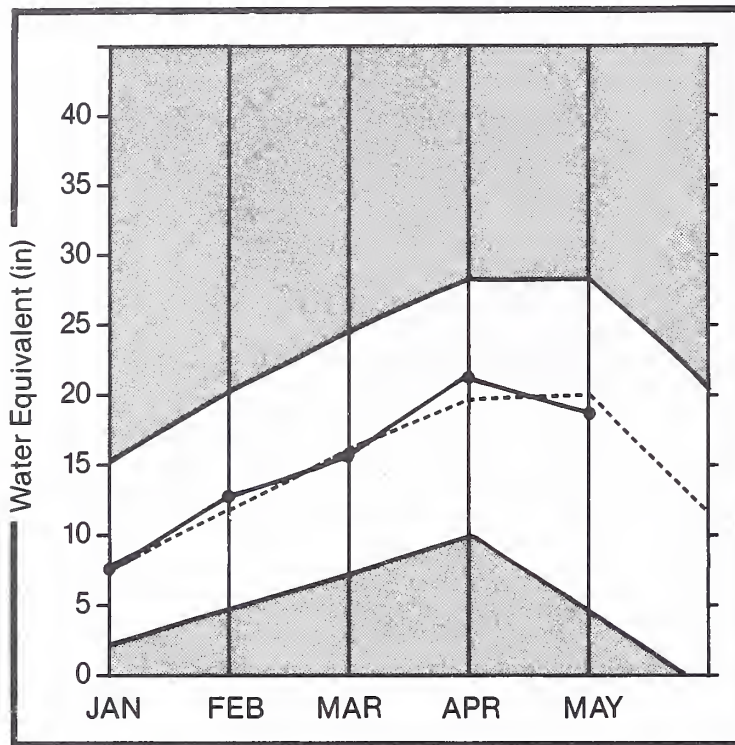
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
RED ROCK RIVER near Monida 2	MAY-JUL MAY-SEP	62 70	78 79	90 99	34 37	84 94	40 46	80 89
BEAVERHEAD RIVER near Grant 2	MAY-JUL MAY-SEP	80 97	73 73	137 165	23 29	109 133	51 61	109 133
BEAVERHEAD RIVER at Barratts 2	MAY-JUL MAY-SEP	100 122	70 70	159 196	41 50	139 169	61 75	143 175
RUBY RIVER near Alder	MAY-JUL MAY-SEP	51 64	68 70	62 77	41 51	68 84	35 44	75 92
BIG HOLE RIVER near Melrose	MAY-JUL MAY-SEP	460 505	75 75	595 660	325 350	595 655	325 355	612 673
WILLOW CREEK near Harrison	MAY-JUL MAY-SEP	12.0 14.0	74 75	21 24	3.4 4.5	17.2 20	6.8 8.0	16.2 18.6
BOULDER RIVER near Boulder	MAY-JUL MAY-SEP	70 76	88 87	96 105	44 47	89 97	51 55	80 87
JEFFERSON RIVER near Three Forks	MAY-JUL MAY-SEP	575 665	69 70	850 1000	280 340	800 925	350 405	839 954

RESERVOIR STORAGE		(1000AF)			WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** THIS YEAR	USEABLE STORAGE LAST YEAR	** AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
LIMA	84.0	32.1	38.5	56.5	BEAVERHEAD	31	149	87
CLARK CANYON	255.6	121.0	179.0	163.2	RUBY	13	124	77
RUBY RIVER	38.8	36.5	39.8	35.6	BIGHOLE	29	119	80
					BOULDER	14	110	66
					JEFFERSON	69	131	80

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
 REAS. MAX. and REAS. MIN. forecasts are for 10% and 90% exceedance levels with the exception of (1) below.
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 (2) - Corrected for upstream diversions or changes in reservoir storage.

Madison Basin

Mountain snowpack* (inches)



*Madison

Maximum



Minimum



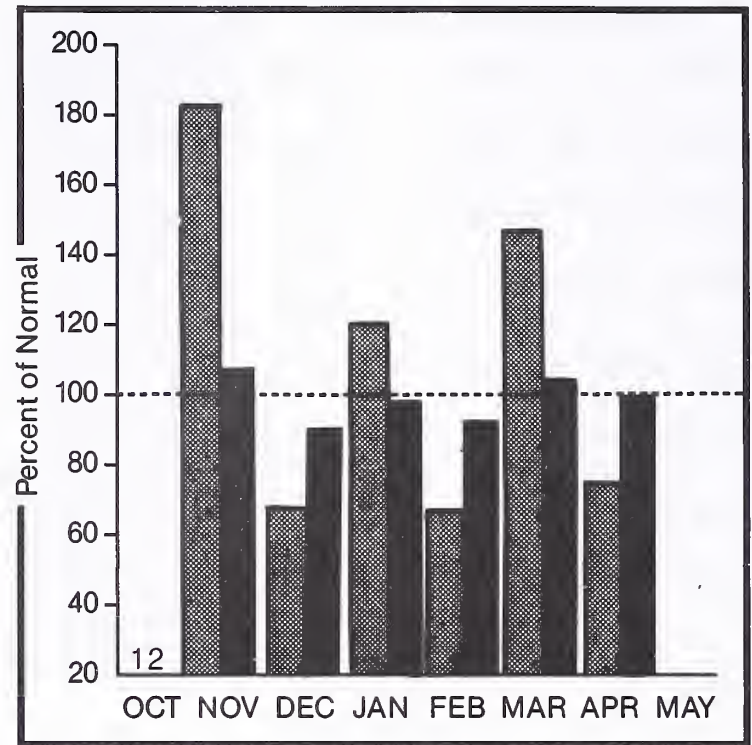
Average



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

April mountain precipitation was below average. As a result of melt and below average snowfall, snowpack levels decreased during the month. The Upper Madison has above average snowpack while the Lower Madison drops to below average. April streamflows were a little above average at Hebgen Dam and a little below average into Ennis Lake. May through September streamflows are forecast to be above average from the upper basin dropping to a little above average near the lower part of the drainage. Peak snowmelt runoff into Hebgen Lake should occur the first week of June.

For more information contact your local Soil Conservation Service Office.

MADISON RIVER BASIN

STREAMFLOW FORECASTS

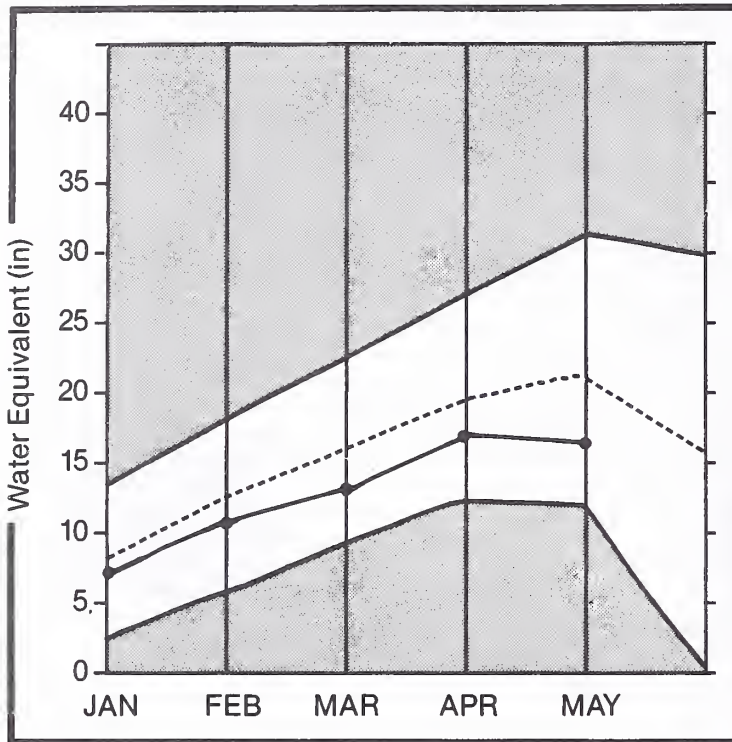
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MADISON RIVER near Grayling 2	MAY-JUL	385	116	435	340	430	340	333
	MAY-SEP	495	112	550	440	555	435	443
MADISON RIVER near McAllister 2	MAY-JUL	625	108	730	515	700	550	577
	MAY-SEP	800	106	915	685	900	700	753

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **	THIS YEAR	LAST YEAR	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
ENNIS LAKE	41.0	32.5	32.8	35.7	MADISON above HERGEN	13	159 108
HERGEN LAKE	377.5	259.7	301.5	236.2	LOWER MADISON	21	131 81
					MADISON	34	143 91

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
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Gallatin Basin

Mountain snowpack* (inches)



*Gallatin

Maximum



Average



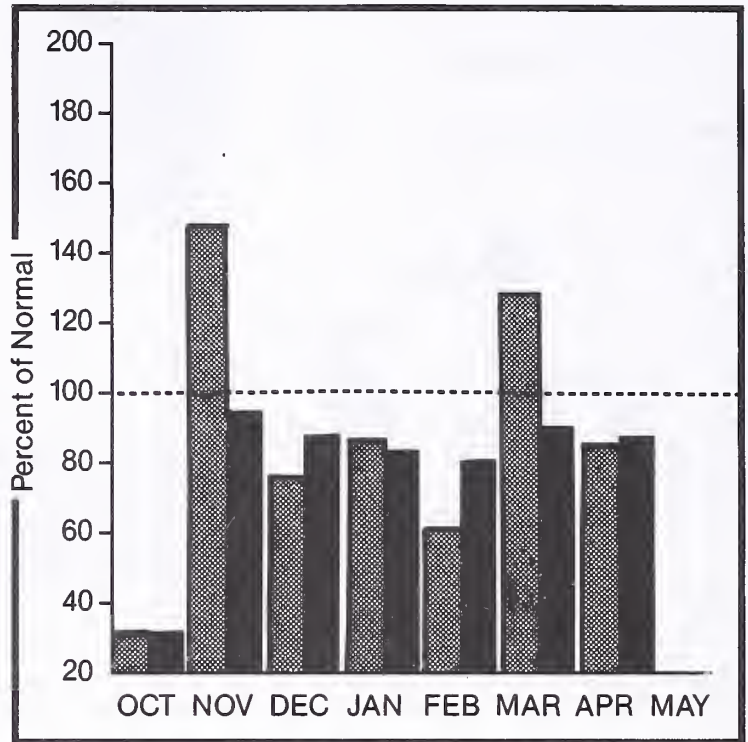
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

Both mountain precipitation and runoff during April were below average. Overall the current snowpack has declined as a result of melt and below average snowfall in April. Snowpacks currently contain below average amounts of water. Streamflows for the next five months are forecast to be in the 80 to 85 percent of average range. The Gallatin River is expected to reach peak snowmelt runoff just before mid-June at near to a little below average levels.

For more information contact your local Soil Conservation Service Office.

GALLATIN RIVER BASIN

STREAMFLOW FORECASTS

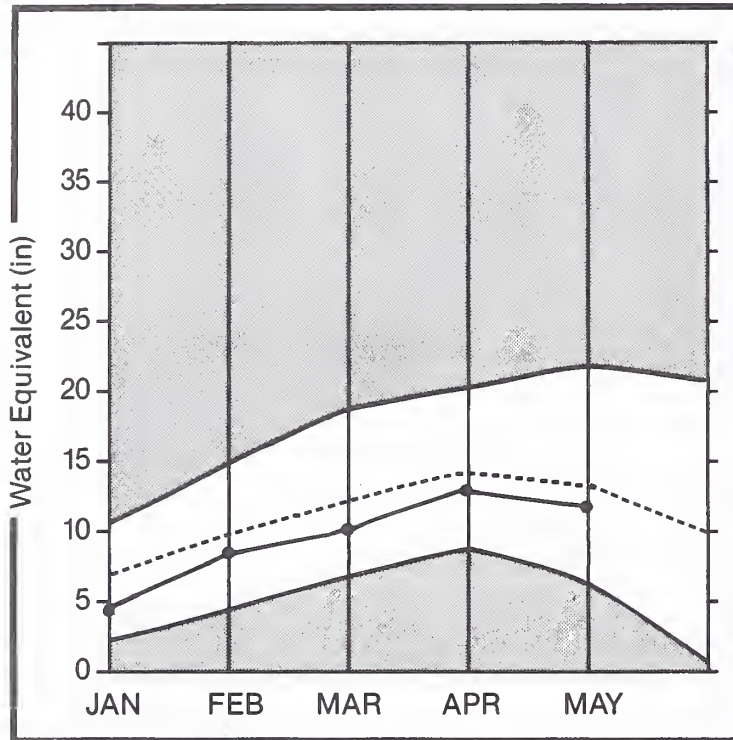
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
GALLATIN RIVER near Gateway	MAY-JUL MAY-SEP	370 445	86 87	480 575	265 330	425 510	315 380	430 510
E & W FK, HYALITE CR, nr Bozeman 2	MAY-JUL MAY-SEP	18.9 22	82 82	24 28	13.8 16.9	23 27	15.0 17.4	23 27
HYALITE CREEK near Bozeman 2	MAY-JUL MAY-SEP	28 33	80 80	37 43	19.9 24	34 40	22 26	35 41
GALLATIN RIVER at Logan	MAY-JUL MAY-SEP	390 470	85 86	610 700	179 240	495 595	285 345	458 546

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE **			WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
		THIS YEAR	LAST YEAR	AVG.				
MIDDLE CREEK	8.0	5.0	6.5	4.4	UPPER GALLATIN	15	118	78
					EAST GALLATIN	12	104	74
					GALLATIN	24	115	78

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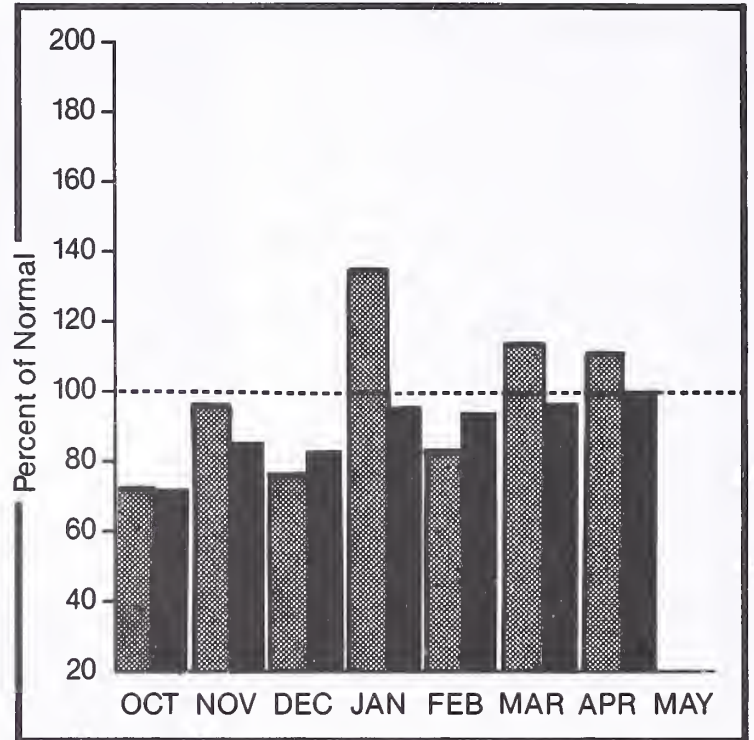
Missouri Basin

Mountain snowpack* (inches)



*Missouri Toston to Fort Peck

Precipitation* (percent of normal)



*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



Water Supply Outlook

April mountain precipitation was generally above average over most of the Basin. Currently, the snowpack water content is below average. Most streamflows were below average during April. Streamflows for the remainder of the season are forecast to be in the 75 to 85 percent of average range over most of the Basin except for streams originating west of Great Falls. Runoff from these areas is forecast to be in the 80 to 95 percent of average range. The Missouri River above Canyon Ferry Reservoir and most streams in the Sun, Teton, and Marias River Drainage are expected to reach peak snowmelt runoff in early June at levels near to a little below average.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
MISSOURI RIVER at Toston 2	MAY-JUL MAY-SEP	1620 1930	86 87			2020 2400	1170 1390	1890 2230
PRICKLY PEAR CREEK nr Clancy	MAY-JUL MAY-SEP	19.0 23	83 82	27 32	12.1 14.9	26 32	11.6 14.0	23 28
SMITH RIVER nr Ft. Logan	MAY-JUL MAY-SEP	44 54	79 79	67 78	22 30	61 75	27 33	56 68
SHEEP CREEK nr White Sulphur Spgs.	MAY-JUL MAY-SEP	13.3 15.6	78 78	15.5 18.0	11.1 13.0	19.1 22	7.5 9.2	17.1 20
BELT CREEK near Monarch	MAY-JUL MAY-SEP	85 93	75 74	108 117	63 70	124 133	46 53	114 126
MISSOURI RIVER at Fort Benton 2	MAY-JUL MAY-SEP	2350 2830	80 82			3110 3730	1470 1800	2930 3450
MISSOURI RIVER at Virgelle 2	MAY-JUL MAY-SEP	2850 3380	85 87			3890 4630	1740 2130	3350 3900
MISSOURI RIVER near Landusky 2	MAY-JUL MAY-SEP	3140 3740	86 88			4340 5140	1940 2300	3650 4240
N.F. MUSSELSHELL near Delpine	MAY-JUL MAY-SEP	3.0 3.7	75 76	4.4 5.3	1.6 2.1	4.6 5.8	1.4 1.6	4.0 4.9
S.F. MUSSELSHELL above Martinsdale	MAY-JUL MAY-SEP	40 42	78 76	59 62	21 23	60 65	19.6 18.9	51 55
MISSOURI RIVER below Fort Peck 2	MAY-JUL MAY-SEP	3070 3620	86 88			4350 5100	1790 2140	3560 4100
LAKE SAKAKAWEA Inflow 2	MAY-JUL MAY-SEP	8200 9400	89 91			11000 12500	5620 6600	9210 10380

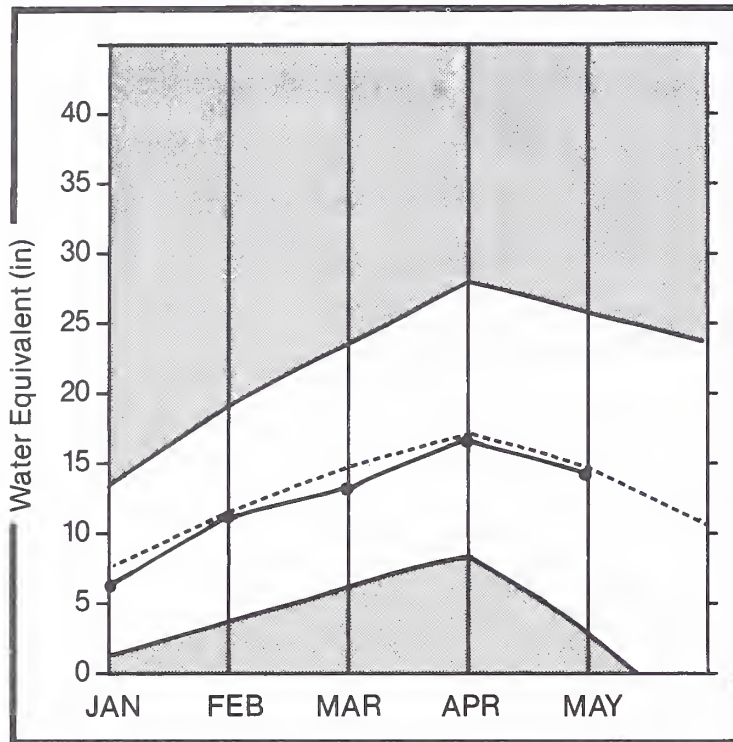
RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** THIS YEAR	USEABLE STORAGE LAST YEAR	** AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
CANYON FERRY LAKE	2043.0	1325.0	1507.0	1505.0	MISSOURI HEADWATERS	110	131	83
HELENA VALLEY	9.2	8.4	8.5	7.5	WEST SIDE MISSOURI	11	114	79
LAKE HELENA	10.4	10.7	10.9	10.0	SMITH-BELT	11	120	81
HAUSER & HELENA	61.9	62.5	63.1	60.0	MISSOURI MAINSTEM	22	117	80
HOLTER LAKE	81.9	80.5	80.4	72.6	SUN-TETON-MARIAS	18	150	94
SMITH RIVER	10.6	5.7	5.0	9.4	JUDITH-MUSSELSHELL	17	115	82
NEULAN CREEK	12.4	8.0	9.4	9.7	MISSOURI above FORT PECK	152	131	84
BAIR	7.0	3.0	3.1	6.0	MILK HEADWATERS	4	196	91
MARTINSDALE	23.1	5.3	7.0	12.3	BEAR PAW	7	1325	85
DEADMAN'S BASIN	72.2	26.2	47.5	56.6	MILK RIVER	11	225	90
FORT PECK LAKE*	18.9	12.6	14.6	15.3	MISSOURI in MONTANA	161	132	84
					MISSOURI blw YELLOWSTONE	264	124	81

*Million Acre Feet

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.
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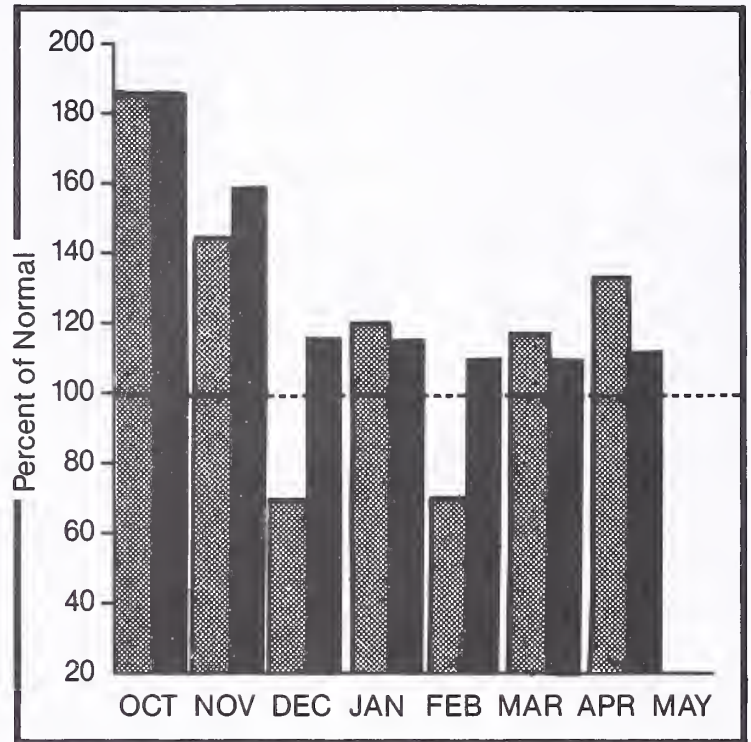
Sun, Teton and Marias Basins

Mountain snowpack* (inches)



* Sun-Teton-Marias

Precipitation* (percent of normal)



* Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



Water Supply Outlook

Above average precipitation was measured in the mountains for April. Snowpacks have been melting and now contain slightly below average water content. During April, runoff was well above average. The May through September runoff is forecast to be in the 80 to 95 percent of average range. The peak snowmelt inflow into Gibson Reservoir and on upper tributaries to the Marias River should occur in early June.

For more information contact your local Soil Conservation Service Office.

SUN-TETON-MARIAS RIVER BASINS

STREAMFLOW FORECASTS

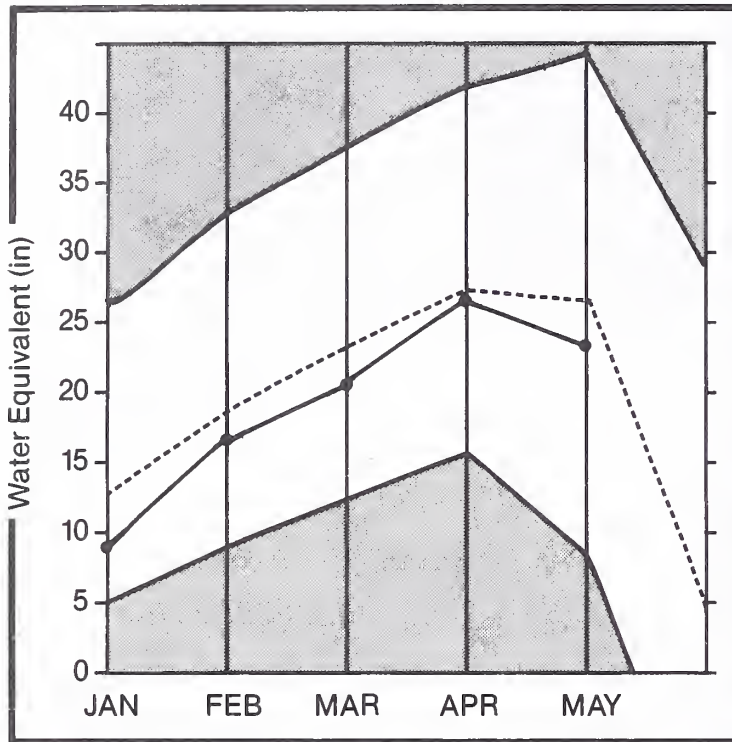
FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SUN RIVER at Gibson Dam 2	MAY-JUL MAY-SEP	380 420	82 82	460 485	305 355	495 545	265 295	462 511
TWO MEDICINE CREEK near Browning 2	MAY-JUL MAY-SEP	180 190	91 90	215 225	148 154	255 265	105 114	197 210
BADGER CREEK near Browning	MAY-JUL MAY-SEP	90 106	93 93	106 122	74 90	127 146	53 66	97 114
SWIFT RESERVOIR Inflow nr Dupuyer	MAY-JUL MAY-SEP	61 72	95 95	74 86	48 58	85 99	37 45	64 76
CUT BANK CREEK at Cut Bank	MAY-JUL MAY-SEP	70 78	89 89	86 96	54 60	100 110	40 46	79 88
MARIAS RIVER near Shelby	MAY-JUL MAY-SEP	360 380	87 87			535 565	230 250	412 436

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS		
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE
GIBSON	99.1	79.6	61.5	53.9	SUN-TETON	13	162 95
PISHKUN	32.0	19.8	23.8	26.6	MARIAS	6	136 90
WILLOW CREEK	32.2	25.2	26.9	23.7	SUN-TETON-MARIAS	18	150 94
LOWER TWO MEDICINE LAKE	11.9	12.5	12.3	10.6			
FOUR HORNS LAKE	19.2	14.0	13.9	12.8			
SWIFT	30.0	12.2	23.3	16.1			
LAKE FRANCES	112.0	64.5	98.0	74.6			
LAKE ELWELL (TIBER)	1347.0	739.9	683.9	582.5			

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St. Mary and Milk Basins

Mountain snowpack* (inches)



* St. Mary

Maximum



Average



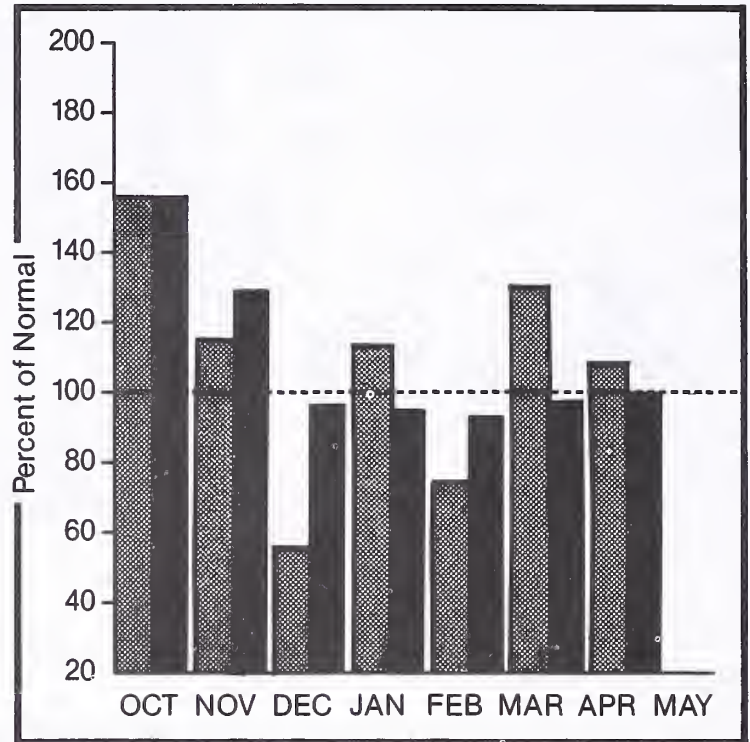
Minimum



Current



Precipitation* (percent of normal)



*Based on selected stations

Monthly precipitation



Year to date precipitation



Water Supply Outlook

Mountain precipitation during April was a little above average. Melt has decreased snowpack to below average levels throughout the St. Mary and Milk River Basins. Runoff during April was well above average. The natural flow of the Milk River without the St. Mary Canal is expected to produce below average runoff while the St. Mary River is forecast to be around 90 percent of average.

For more information contact your local Soil Conservation Service Office.

ST. MARY and MILK RIVER BASINS

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
SWIFTCURRENT CREEK at Sherburne 2	MAY-JUL MAY-SEP	93 108	92 91	100 118	87 102	115 137	71 79	101 119
ST. MARY'S RIVER near Babb 2	MAY-JUL MAY-SEP	350 410	91 91	385 460	310 355	400 490	300 330	383 453
MILK RIVER at Eastern Crossing	MAY-SEP	31	61			47	26	51
MILK RIVER at Eastern Crossing 2	MAY-SEP	168	82			170	168	204

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR.	% OF AVERAGE
LAKE SHERBURNE	64.3	5.5	6.6	19.6	MILK HEADWATERS	4	196	91
FRESNO	127.0	60.5	94.7	96.5	BEAR PAW	7	1325	85
BEAVER CREEK	3.5	1.3	3.0	2.6	MILK RIVER	11	225	90
NELSON	66.8	20.4	41.0	42.0	ST. MARY	11	151	85
					ST. MARY and MILK	18	156	85
					BOW RIVER in ALBERTA	16	120	107
					OLDMAN RIVER in ALBERTA	7	152	123

WET SUBS. and DRY SUBS. represent 150 and 50 percent subsequent precipitation events respectively.

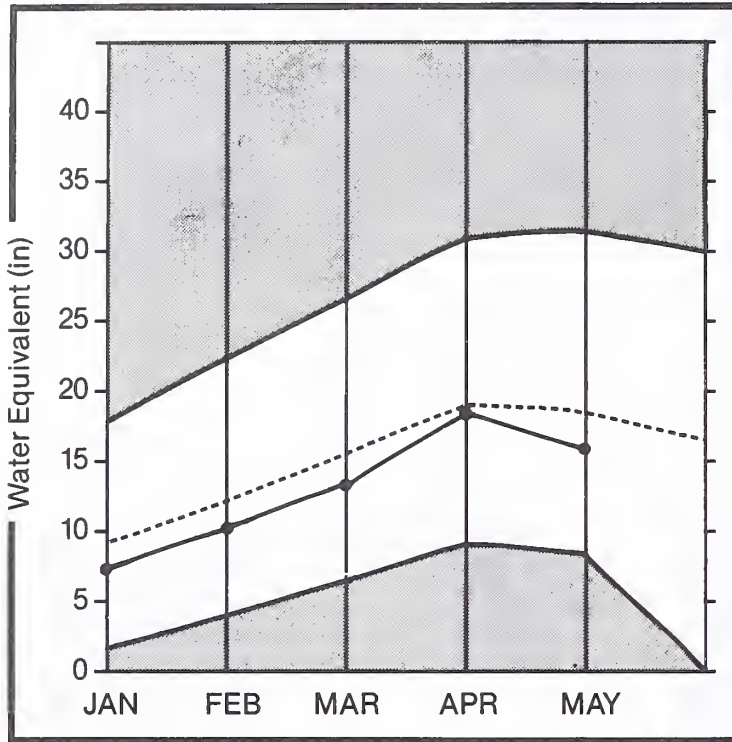
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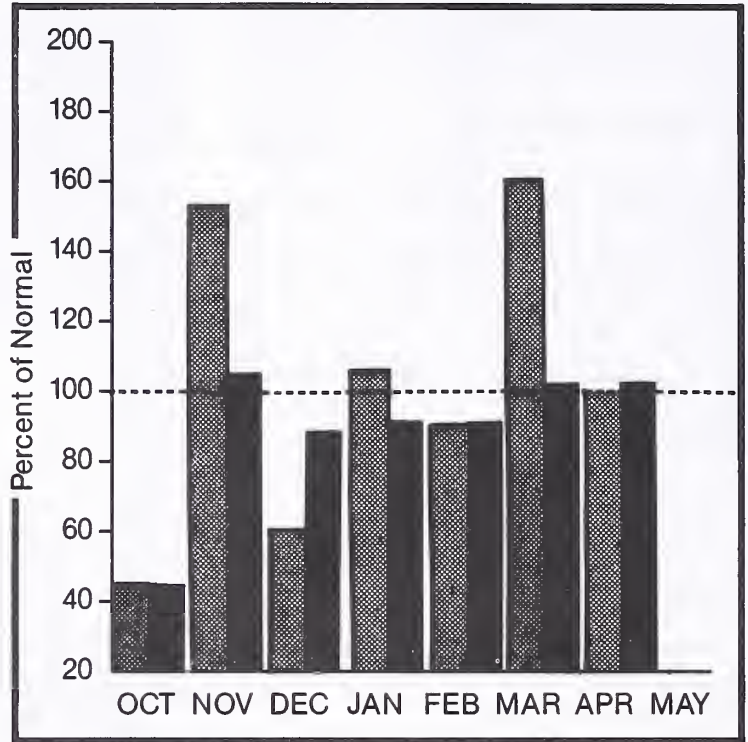
Yellowstone Basin

Mountain snowpack* (inches)



*Yellowstone above Big Horn

Precipitation* (percent of normal)



*Based on selected stations

Maximum



Average



Minimum



Current



Monthly precipitation



Year to date precipitation



Water Supply Outlook

April mountain precipitation was near average over the Basin. The current snowpack water content has decreased from last month's levels as a result of melt. Snowpack varies from below average in Montana to well below average in the Wyoming portion of the Yellowstone Drainage. Runoff during April was above average in the Montana tributaries with mostly below average flows from Wyoming. Streamflow for spring and summer months is forecast to be above average in the Yellowstone Headwaters and from tributaries originating in or near Yellowstone National Park. Other drainages are forecast to have below average runoff. Peak snowmelt runoff on the Yellowstone River and its major tributaries is expected to occur around mid-June at levels near to a little above average.

For more information contact your local Soil Conservation Service Office.

STREAMFLOW FORECASTS

FORECAST POINT	FORECAST PERIOD	MOST PROBABLE (1000AF)	MOST PROBABLE (% AVG.)	WET SUBS. (1000AF)	DRY SUBS. (1000AF)	REAS. MAX. (1000AF)	REAS. MIN. (1000AF)	25 YR. AVG. (1000AF)
YELLOWSTONE at Lake Outlet	MAY-JUL MAY-SEP	610 880	110 112	655 935	560 825	675 975	545 785	555 784
YELLOWSTONE at Corwin Springs	MAY-JUL MAY-SEP	1750 2120	111 111	1940 2350	1560 1950	2000 2430	1500 1810	1570 1910
YELLOWSTONE near Livingston	MAY-JUL MAY-SEP	1970 2390	109 108	2170 2610	1770 2170	2260 2750	1680 2030	1810 2220
SHIELDS RIVER near Livingston	MAY-JUL MAY-SEP	105 120	84 85	135 147	75 90	138 157	73 83	125 142
BOULDER RIVER at Big Timber	MAY-JUL MAY-SEP	320 345	94 93	370 395	270 295	390 425	250 265	340 372
WEST ROSEBUD CREEK near Roscoe	MAY-JUL MAY-SEP	59 76	94 94	68 85	50 67	72 92	46 60	63 81
STILLWATER RIVER nr Absarokee 2	MAY-JUL MAY-SEP	470 555	94 92	540 640	400 465	600 710	340 400	501 602
CLARKS FORK RIVER near Belfry	MAY-JUL MAY-SEP	530 590	102 101	610 660	455 515	630 700	430 480	519 582
COONEY RESERVOIR Inflow	MAY-JUL MAY-SEP	29 38	71 75	44 54	13.4 21	40 52	17.5 24	41 51
YELLOWSTONE RIVER at Billings 2	MAY-JUL MAY-SEP	3350 4000	96 96			3910 4670	2760 3290	3480 4160
YELLOWSTONE RIVER at Miles City 2	MAY-JUL MAY-SEP	4810 5670	93 94			5940 6990	3730 4410	5150 6020
YELLOWSTONE RIVER near Sidney 2	MAY-JUL MAY-SEP	5220 6080	92 92			6650 7740	3970 4620	5700 6640

RESERVOIR STORAGE (1000AF)					WATERSHED SNOWPACK ANALYSIS			
RESERVOIR	USEABLE CAPACITY	** USEABLE STORAGE ** THIS YEAR	LAST YEAR	AVG.	WATERSHED	NO. COURSES AVG'D	THIS YEAR AS % OF LAST YR. AVERAGE	
MYSTIC LAKE	21.0	0.9	0.7	2.0	YELLOWSTONE ab LIVINGSTON	25	135	92
COONEY	27.4	22.9	23.9	18.6	SHIELDS	10	129	87
BIGHORN LAKE	1356.0	653.5	831.8	681.2	BOULDER-STILLWATER	9	134	87
TONGUE RIVER	68.0	35.6	37.8	36.7	CLARK'S FORK-ROCK CREEK	21	122	86
					YELLOWSTONE above BIGHORN	51	127	85
					LITTLE BIGHORN	5	84	65
					WIND RIVER (Wyoming)	30	98	66
					BIGHORN RIVER (Wyoming)	32	110	77
					BIGHORN BASIN (Total)	57	108	74
					TONGUE RIVER (Wyoming)	15	87	67
					POWDER RIVER (Wyoming)	15	75	50
					YELLOWSTONE RIVER	117	113	78

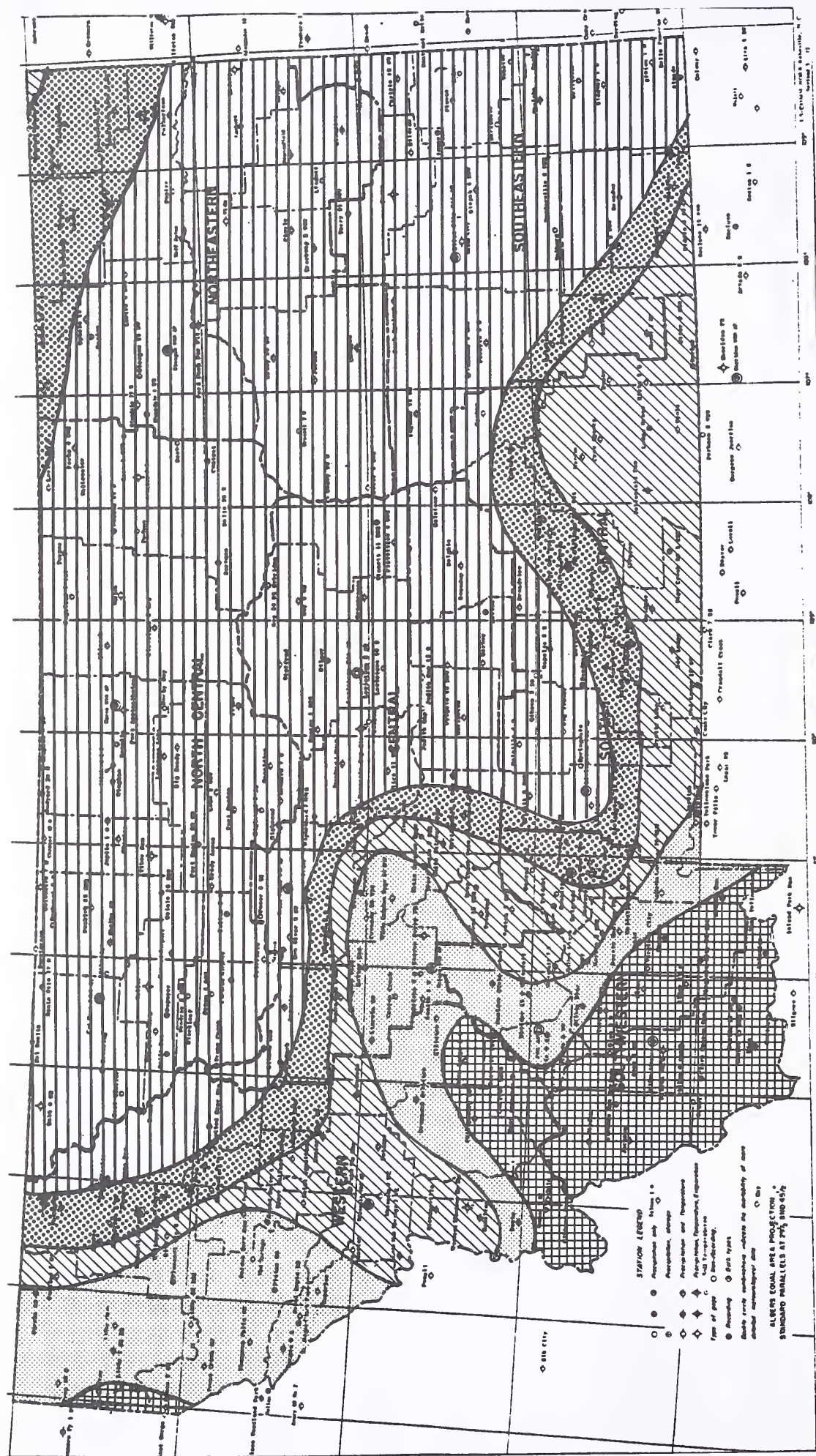
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Snow Data Measurements

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
MONTANA							DAD CREEK LAKE	8400	4/29/89	42	12.8	13.1	17.2
ABUNDANCE LAKE	8800	4/28/89	55	17.6	16.2	23.8	DAISY PEAK	7600	4/27/89	36	9.2	5.8	10.2
AMBROSE	6480	4/26/89	26	10.4	7.9	13.7	DALY CREEK	5780	4/28/89	11	4.2	7.2	12.4
ARCH FALLS	7350	4/26/89	30	10.2	11.4	15.0	DALY CREEK PILLOW	5780	5/01/89	---	1.3	.0	6.0
ASHLEY DIVIDE	4820	4/28/89	2	.7	.0	1.4	DARKHORSE LK. PILLOW	8700	5/01/89	---	26.3	22.4	27.9
BADGER PASS PILLOW	6900	5/01/89	---	38.4	28.6	39.0	DARKHORSE LAKE	8600	4/28/89	64	26.5	21.4	30.1
BADGER PASS	6900	4/30/89	93	37.7	32.4	42.5	DAVIS CREEK	5400	4/26/89	46	19.0	15.9	22.3
BALD EAGLE PEAK	5700	4/24/89	108	56.1E	41.0	63.0	DEADMAN CR PILLOW	6450	5/01/89	---	6.9	3.1	6.9
BALD RIDGE	7500	4/28/89	42	12.0	9.1	13.3	DEADMAN CREEK	6450	4/27/89	20	6.8	3.7	8.7
BANFIELD MTN PILLOW	5600	5/01/89	---	15.1	9.3	18.6	DESERT MOUNTAIN	5600	4/29/89	25	10.2	4.2	14.3
BANFIELD MOUNTAIN	5600	4/26/89	42	16.6	11.2	22.4	DEVILS SLIDE	8100	4/26/89	52	19.0	19.2	27.1
BAREE CREEK	5500	4/27/89	72	35.0	28.3	45.6	DISCOVERY BASIN	7050	4/25/89	24	8.6	7.3	11.0
BAREE MIDWAY	4600	4/27/89	50	23.8	16.8	31.8	DIVIDE	7800	4/29/89	31	9.8	3.2	11.4
BAREE TRAIL	3800	4/27/89	1	.5	.0	1.5	DIVIDE PILLOW	7800	5/01/89	---	11.2	9.5	12.8
BARKER LAKES PILLOW	8250	5/01/89	---	15.8	13.7	17.0	DIX HILL	6400	4/30/89	3	.8	.0	5.4
BASIN CREEK	7180	4/28/89	23	4.9	.0	10.3	DUPUYER CREEK PILLOW	5750	5/01/89	---	16.0	6.7	10.7
BASIN CREEK PILLOW	7180	5/01/89	---	7.2	8.0	9.9	EAST BOULDER S	9250	4/30/89	75	31.5	21.5	34.5
BASSOON PEAK	5150	4/27/89	4	1.2	.0	6.8	EAST FORK R.S.	5400	4/28/89	0	.0	.0	1.2
BEAGLE SPRINGS	8850	4/29/89	21	5.4	7.0	9.6	ELK HORN SPRINGS	7800	4/28/89	17	5.5	3.9	8.6
BEAGLE SPGS PILLOW	8850	5/01/89	---	6.2	7.2	9.0	ELK PEAK	8000	4/25/89	46	14.4	14.0	20.0
BEAR BASIN	8150	4/25/89	47	16.7	16.8	23.4	EMERY CREEK	4350	4/29/89	15	7.1	3.0	9.7
BEAR PAW SKI AREA	5200	4/26/89	9	2.5	.0	4.2	EMERY CREEK PILLOW	4350	5/01/89	---	4.1	3.3	8.5
BEAVER CREEK PILLOW	7850	5/01/89	---	18.3	14.8	21.8	FATTY CREEK	5500	4/26/89	58	24.9	16.2	24.8
BIG CREEK	6750	4/26/89	99	44.9	32.8	51.2	FISH CREEK	8000	4/28/89	35	9.7	1.4	13.4
BIG SKY	7700	4/25/89	36	11.9	12.7	17.7	FISHER CREEK PILLOW	9100	5/01/89	---	39.5	30.5	39.5
BIG SKY MEADOW	6350	4/25/89	1	.2	.3	3.9	FISHER CREEK	9100	5/01/89	99	42.1	32.3	42.8
BIG SNOWY	7150	4/28/89	56	17.4	21.5	25.3	FIVE-BULL	5700	4/30/89	12	3.6	.0	3.8
BISSEON CREEK	4920	4/25/89	22	8.7	--	--	FLATTOP MTN PILLOW	6300	5/01/89	---	44.3	34.4	49.2
BLACK BEAR	7950	4/25/89	98	48.1	36.5	44.2	FLEECER RIDGE	7500	4/21/89	21	8.2	5.4	9.5
BLACK BEAR PILLOW	7950	5/01/89	---	49.3	33.6	39.1	FOOLHEN	8280	4/28/89	44	14.4	14.2	19.3
BLACK MOUNTAIN	7750	5/01/89	40	15.8	11.5	18.1	FOUR MILE	6900	4/25/89	12	3.2	1.9	8.1
BLACK PINE PILLOW	7100	5/01/89	---	9.7	9.6	14.8	FOURTH OF JULY	3450	4/27/89	0	.0	.0	1.2
BLACK PINE	7100	4/25/89	24	8.8	7.8	13.9	FRED BURR PASS	8000	4/28/89	70	22.0	20.0	29.4
BLACKTAIL	5650	4/29/89	35	13.9	2.1	--	FREIGHT CREEK	6000	4/30/89	28	8.9	9.5	14.2
BLOODY DICK PILLOW	7550	5/01/89	---	7.9	7.4	10.0	FRIDAY HILL	4620	4/27/89	26	11.5	.0	12.0
BLOODY DICK	7600	4/28/89	31	9.9	8.2	13.7	FROHNER MEADOWS	6480	4/28/89	14	2.0	1.5	6.1
BLUE LAKE	5900	4/30/89	54	22.2	15.9	24.4	FROHNER MOWS PILLOW	6480	5/01/89	---	6.7	5.4	9.0
BOTS SOTS	7750	4/27/89	16	3.6	3.9	9.3	GARVER CREEK PILLOW	4250	4/26/89	---	2.8	.6	4.0
BOULDER MOUNTAIN	7950	4/24/89	45	15.6	17.2	22.7	GARVER CREEK	4250	4/26/89	7	2.5	.0	4.7
BOULDER MTN PILLOW	7950	5/01/89	---	20.8	16.2	22.6	GIBBONS PASS	7100	4/26/89	43	19.6	15.8	23.9
BOX CANYON	6670	4/30/89	16	6.3	5.0	7.5	GOAT MOUNTAIN	7000	4/28/89	29	7.6	4.3	9.5
BOX CANYON PILLOW	6700	5/01/89	---	1.5	2.4	5.1	GOLD STONE	8100	4/28/89	40	13.8	11.4	19.2
BOXELDER CREEK	5100	4/26/89	23	6.6	.8	2.2	GRASSHOPPER	7000	4/25/89	11	3.8	1.5	5.3
BRANHAM LAKES	8850	5/01/89	67	20.6	25.1	35.1	GRAVE CRK PILLOW	4300	5/01/89	---	7.6	.0	8.5
BRIDGER BOWL PILLOW	7250	4/27/89	---	23.6	19.8	29.7	GRAVE CREEK	4300	4/27/89	25	11.8	2.6	14.1
BRIDGER BOWL	7250	4/27/89	71	27.0	19.7	31.3	GRIFFIN CR DIVIDE	5150	4/27/89	12	4.2	.4	7.3
BRISTOW CREEK	3900	4/26/89	0	.0	.0	1.6	GUNSIGHT LAKE	6300	4/30/89	85	41.6	35.1	42.2
BRUSH CREEK TIMBER	5000	4/28/89	14	4.0	.0	7.0	HAND CREEK	5030	4/28/89	27	9.3	2.6	10.1
BULL MOUNTAIN	6600	4/21/89	0	.0	.0	3.7	HAND CREEK PILLOW	5030	5/01/89	---	9.4	3.5	9.1
CABIN CREEK	5200	4/27/89	5	1.0	.0	2.2	HAWKINS LAKE PILLOW	6450	5/01/89	---	26.0	25.1	30.1
CALL ROAD	8050	4/29/89	41	11.6	8.6	13.9	HAWKINS LAKE	6450	4/26/89	72	27.5	27.2	32.8
CALVERT CREEK	6430	4/27/89	21	7.5	4.6	9.6	HEART LAKE TRAIL	4800	4/29/89	41	18.6	9.6	17.4
CALVERT CR PILLOW	6430	5/01/89	---	.7	.0	2.5	HEBGEN DAM	6550	4/26/89	21	7.9	1.2	7.6
CAMP MISERY	6400	4/29/89	111	50.5	33.6	53.9	HELL ROARING DIVIDE	5770	4/27/89	67	28.6	19.0	31.6
CAMP SENIA	7890	4/27/89	19	4.2	5.6	9.2	HERRIG JUNCTION	4850	4/25/89	51	23.0	15.4	25.0
CARROT BASIN PILLOW	9000	5/01/89	---	30.7	22.4	32.1	HOLBROOK	4530	4/30/89	0	.0	.0	2.0
CARROT BASIN	9000	5/01/89	95	38.8	24.8	41.7	HOOD MEADOW	6600	4/26/89	15	4.8	9.0	11.4
CASHE CREEK PILLOW	7800	5/01/89	---	6.2	7.9	10.5	HOODOO BASIN PILLOW	6050	5/01/89	---	40.5	35.0	49.6
CEDAR GROVE	3760	4/24/89	25	10.6	1.2	6.1	HOODOO BASIN	6050	4/29/89	78	39.8	42.6	53.2
CHESSMAN RESERVOIR	6200	4/28/89	17	2.5	.8	2.7	HOODOO CREEK	5900	4/29/89	80	36.5	35.5	49.3
CHICKEN CREEK	4060	4/25/89	7	2.6	.0	3.8	ICEBERG LAKE NO 3	5600	4/26/89	58	24.6	16.8	31.0
CLOVER MOW PILLOW	8800	5/01/89	---	15.7	13.8	19.0	INDEPENDENCE	7850	4/30/89	38	14.8	11.8	18.2
CLOVER MEADOW	8600	4/29/89	50	14.7	13.1	20.6	INTERGAARD	6450	4/25/89	18	5.2	4.1	8.0
COLE CREEK	7850	4/28/89	63	14.7	15.4	23.3	JAHNKE LAKE TRAIL	7200	4/28/89	17	5.0	6.0	9.2
COLE CREEK PILLOW	7850	5/01/89	---	17.7	16.2	20.6	JOHNSON PARK	6450	4/27/89	5	1.4	.6	2.6
COLLEY CREEK	6300	4/28/89	7	1.5	2.8	4.2	JOSEPHINE LOWER NO 9	4900	4/25/89	33	13.1	7.7	16.5
COMBINATION	5600	4/25/89	4	1.2	.0	3.5	KEELER CREEK	3300	4/25/89	5	1.9	.0	1.2
COMBINATION PILLOW	5600	5/01/89	---	.2	.0	2.1	KINGS HILL	7500	4/27/89	40	12.6	12.0	16.1
COOKE STATION	8150	5/01/89	44	19.9	16.2	21.4	KIWANIS CAMP	3720	4/26/89	0	.0	.0	.3
COPPER BOTTOM	5200	5/01/89	4	1.6	1.0	4.9	KRAFT CREEK PILLOW	4750	5/01/89	---	7.8	.0	4.0
COPPER BOTTOM PILLOW	5200	5/01/89	---	7.6	3.0	6.8	LAKE CREEK	6100	4/29/89	1	.2	.0	3.6
COPPER CAMP PILLOW	6950	5/01/89	---	30.6	23.2	33.5	LAKEVIEW CANYON	6930	4/27/89	29	8.4	.0	12.3
COPPER CAMP	6950	5/01/89	60	28.8	21.4	30.6	LAKEVIEW RDG. PILLOW	7400	5/01/89	---	8.7	.2	9.6
COPPER CREEK	5700	5/01/89	6	2.2	6.8	10.1	LAKEVIEW RIDGE	7400	4/27/89	23	6.8	.0	10.3
COPPER MOUNTAIN	7700	4/24/89	24	6.8	5.8	11.8	LEMHI PASS	7480	4/28/89	7	2.6	3.2	7.2
COTTONWOOD CREEK	6400	5/01/89	24	8.6	6.6	8.4	LEMHI RIDGE	8100	4/28/89	26	7.6	7.6	10.0
CRYSTAL LAKE	6050	4/28/89	31	8.0	10.8	12.9	LEMHI RIDGE PILLOW	8100	5/01/89	---	8.6	9.2	10.5
CRYSTAL LAKE PILLOW	6050	5/01/89	---	7.2	9.0	12.5	LICK CREEK PILLOW	6860	5/01/89	---	8.4	7.4	8.6
							LICK CREEK	6860	4/26/89	15	4.9	10.2	10.3
							LITTLE PARK	7400	4/25/89	37	12.6	11.0	17.8

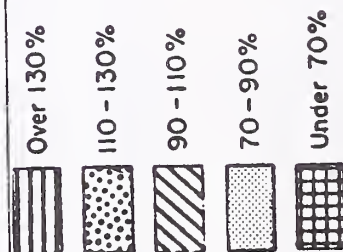
SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85	SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-85
LOGAN CREEK	4300	4/27/89	10	2.6	.0	2.5	S.F. SHIELDS PILLOW	8100	5/01/89	---	20.7	16.5	21.5
LONE MOUNTAIN	8880	4/25/89	57	20.0	16.4	26.7	S.F. SHIELDS	8100	5/01/89	73	27.7	25.0	29.0
LOST HORSE	5940	4/27/89	61	27.6	25.0	33.9	SPOTTED BEAR MTN.	7000	4/30/89	25	11.3	2.4	10.4
LOST SOUL	4800	4/26/89	19	8.0	2.4	8.8	SPUR PARK PILLOW	8100	5/01/89	---	23.9	20.0	24.2
LOWER TWIN PILLOW	7900	5/01/89	---	21.9	16.1	22.7	SPUR PARK	8100	4/27/89	62	20.7	18.6	24.1
LOWER TWIN	7900	4/25/89	53	20.5	17.3	25.2	SQUAW PEAK	6150	4/26/89	40	15.2	--	--
LUBRECHT PILLOW	4680	5/01/89	---	.0	.0	.4	STAHL PEAK	6030	4/27/89	95	43.8	31.1	44.2
LUBRECHT FOREST NO 3	5450	5/02/89	4	1.1	.0	3.6	STAHL PEAK PILLOW	6030	5/01/89	---	40.1	26.4	41.2
MADISON PLT PILLOW	7750	5/01/89	---	31.4	20.1	24.3	STAR LAKE E	9650	4/25/89	103	46.5	35.5	47.7
MADISON PLATEAU	7750	4/25/89	59	28.1	20.0	23.2	STEMPLE PASS	6600	4/28/89	27	7.6	7.1	11.1
MANY GLACIER	4900	5/03/89	30	13.0	8.0	12.2	STORM LAKE	7780	5/02/89	38	13.3	12.4	16.1
MANY GLACIER PILLOW	4900	5/01/89	---	5.5	.2	8.6	STRYKER BASIN	6180	4/25/89	71	31.7	19.5	37.1
MARIAS PASS	5250	4/30/89	31	12.0	4.4	16.0	STUART MILL	6500	4/25/89	3	.4	.4	--
MAYNARD CREEK	6210	4/27/89	43	13.5	12.2	17.0	STUART MOUNTAIN	7400	4/26/89	74	32.4	19.7	33.9
MAYNARD CR PILLOW	6210	4/27/89	---	12.4	9.1	13.1	SUCKER CREEK	3960	4/26/89	0	.0	.0	.4
MIDDLE MILL CREEK	7850	5/01/89	32	11.0	9.4	18.2	TAYLOR ROAD	4080	4/26/89	0	.0	.0	.7
MILL CREEK	7500	4/28/89	23	6.6	7.6	12.3	TEN MILE LOWER	6600	4/26/89	13	4.2	3.4	6.2
MINERAL CREEK	4000	4/29/89	27	11.0	1.8	12.3	TEN MILE MIDDLE	6800	4/26/89	29	9.5	9.5	13.2
MONUMENT PK PILLOW	8850	5/01/89	---	19.9	16.8	24.6	TEN MILE UPPER	8000	4/26/89	36	12.8	12.1	16.1
MONUMENT PEAK	8850	4/30/89	67	27.2	21.9	30.0	TEPEE CREEK PILLOW	8000	5/01/89	---	13.2	10.4	14.7
MOSS PEAK	6780	4/26/89	96	41.2	31.2	--	TEPEE CREEK	8000	4/29/89	48	16.4	11.0	17.6
MOSS PEAK PILLOW	6780	5/01/89	---	38.2	26.8	48.1	TIMBERLINE CREEK	8850	4/27/89	44	12.5	13.8	18.7
MOUTON RESERVOIR	6850	5/02/89	10	3.6	2.3	3.1	TRAIL CREEK	7090	4/28/89	9	2.8	1.8	7.5
MOUNT ALLEN NO 7	5700	4/25/89	92	37.7	29.9	46.1	TRINKUS LAKE	6100	4/30/89	76	38.8	29.8	45.2
MT LOCKHART PILLOW	6400	5/01/89	---	21.6	18.1	23.0	TRUMAN CREEK	4060	4/29/89	0	.0	.0	.7
MOUNT LOCKHART	6400	5/01/89	52	22.4	17.2	22.8	TV MOUNTAIN	6800	4/26/89	43	17.9	9.0	20.0
MUDD LAKE	7650	4/27/89	38	15.8	15.4	20.4	TWELVEMILE PILLOW	5600	5/01/89	---	5.7	2.6	13.2
MULE CREEK	8300	4/24/89	41	14.2	14.8	16.0	TWELVEMILE CREEK	5600	4/27/89	15	7.4	3.8	16.0
MULE CREEK PILLOW	8300	5/01/89	---	16.3	15.2	16.2	TWENTY-ONE MILE	7150	5/02/89	32	14.5	7.0	16.3
NEVADA CREEK	6480	5/01/89	32	12.9	8.7	12.4	TWIN CREEKS	3580	4/30/89	0	.0	.0	2.3
NEVADA CREEK PILLOW	6480	5/01/89	---	14.9	11.1	13.6	TWIN LAKES PILLOW	6400	5/01/89	---	34.7	31.4	42.6
NEWTON MOUNTAIN	5600	4/27/89	76	33.6	24.6	36.8	TWIN LAKES	6510	4/27/89	78	37.0	34.0	45.2
NEZ PERCE CMP PILLOW	5650	5/01/89	---	9.7	10.7	10.6	UPPER HOLLAND LAKE	6200	4/30/89	81	37.8	26.8	36.7
NEZ PERCE CAMP	5650	4/28/89	13	5.6	9.0	12.7	WALORON PILLOW	5600	5/01/89	---	9.2	3.7	7.0
NEZ PERCE CREEK	6600	4/24/89	4	.4	.4	4.3	WALDRON	5600	5/01/89	14	4.8	.0	5.5
NEZ PERCE PASS	6570	4/28/89	25	10.4	9.2	15.5	WARM SPRINGS	7800	4/28/89	53	18.9	14.5	22.0
NOISY BASIN	6040	4/29/89	106	48.9	31.0	52.5	WARM SPRINGS PILLOW	7800	5/01/89	---	20.0	19.5	31.2
NOISY BASIN PILLOW	6040	5/01/89	---	46.0	29.1	46.7	WEASEL DIVIDE	5450	4/27/89	78	35.3	24.4	35.1
N.F. ELK CR PILLOW	6250	5/01/89	---	7.9	.6	10.2	WEST YELL 'ST PILLOW	6700	5/03/89	---	1.7	.0	6.2
NORTH FORK JOCKO	6330	4/26/89	104	48.8	30.6	46.6	WEST YELLOWSTONE	6700	5/03/89	16	5.8	.0	8.0
NORTH MEADOW	7500	4/25/89	19	5.0	4.3	10.6	WHISKEY CREEK PILLOW	6800	5/01/89	---	18.1	10.6	15.7
N.E. ENTRANCE PILLOW	7350	5/01/89	---	3.0	1.6	6.7	WHISKEY CREEK	6800	4/25/89	44	21.6	10.7	18.7
NORTHEAST ENTRANCE	7350	4/30/89	14	4.4	.0	7.0	WHITE MILL PILLOW	8700	5/01/89	---	28.1	19.9	27.9
NORCH	8500	4/29/89	52	14.8	9.6	20.0	WHITE MILL	8700	5/01/89	80	34.6	23.9	30.5
OPHIR PARK	7150	4/30/89	42	16.7	11.9	18.2	WHITE PINE RIDGE	8850	4/29/89	9	2.1	2.0	6.4
PALISADE CREEK	8250	4/27/89	67	28.8	26.8	32.8	WILLOW CREEK	6500	4/28/89	11	1.7	3.1	5.4
PETERSON MDW PILLOW	7200	5/02/89	---	9.8	9.8	12.1	WOOD CREEK	5960	4/30/89	26	8.3	3.4	7.5
PETERSON MEADOWS	7200	5/02/89	26	9.8	9.3	11.6	WOOD CREEK PILLOW	5960	5/01/89	---	9.7	4.6	9.2
PICKET PIN O	9450	4/30/89	55	24.0	16.5	28.8	WRONG CREEK	5700	4/25/89	24	8.4	4.8	10.4
PICKFOOT CREEK	6650	4/24/89	8	2.4	3.2	7.1	WRONG RIDGE	6800	4/26/89	44	17.0	13.1	19.6
PICKFOOT CRK PILLOW	6650	5/01/89	---	5.9	2.4	6.7							
PIEGAN PASS NO 6	5500	4/25/89	86	34.0	23.9	39.6							
PIKE CREEK PILLOW	5930	5/01/89	---	27.3	17.0	26.8							
PIPESTONE PASS	7200	4/24/89	7	1.2	2.6	5.7							
PLACER BASIN F	8830	4/30/89	51	22.0	12.0	23.4							
PLACER BASIN PILLOW	8830	5/01/89	---	19.8	17.1	19.5							
POORMAN CREEK	5100	4/24/89	57	27.2	16.4	32.0							
PORCUPINE PILLOW	6500	5/01/89	---	4.4	.8	4.4							
PORCUPINE	6500	4/28/89	24	6.6	2.9	7.4							
POTOMAGETON PARK	7150	4/28/89	25	10.4	.6	10.7							
PTARMIGAN	5800	4/26/89	73	30.6	23.8	37.9							
REO MOUNTAIN	6000	5/01/89	35	13.9	9.9	18.6							
REO TOP	5260	4/27/89	61	27.0	15.8	29.6							
REVAIS CREEK	4800	4/26/89	0	.0	--	--							
ROCK CREEK	5600	4/27/89	11	2.6	2.7	6.2							
ROCK CREEK MEADOW	8160	4/28/89	63	20.3	17.7	24.7							
ROCKER PEAK	8000	4/26/89	34	11.5	12.7	17.0							
ROCKER PEAK PILLOW	8000	5/01/89	---	14.6	15.1	18.5							
ROCKY BOY	4700	4/26/89	2	.2	.0	1.7							
ROCKY BOY PILLOW	4700	4/26/89	---	1.3	.0	2.9							
SACAJAWEA	6550	4/27/89	38	10.4	7.4	14.3							
SADDLE MTN PILLOW	7900	5/01/89	---	22.5	20.1	29.1							
SADDLE MOUNTAIN	7940	4/26/89	56	25.3	22.2	28.6							
SENTINEL CREEK	8300	4/28/89	60	21.6	16.5	26.0							
SHORT CREEK	7000	5/01/89	3	.6	1.5	--							
SHOWER FALLS	8100	4/26/89	53	19.8	20.4	29.0							
SHOWER FALLS PILLOW	8100	5/01/89	---	21.9	23.0	29.5							
SILVER RUN	6630	4/28/89	4	.5	1.3	3.8							
SILVER RUN PILLOW	6630	5/01/89	---	.0	.9	1.4							
SKALKAWO PILLOW	7260	5/01/89	---	23.5	21.3	25.6							
SKALKAWO SUMMIT	7250	4/28/89	56	21.4	19.7	27.6							
SKYLARK TRAIL PILLOW	6200	5/01/89	---	23.9	26.7	34.0							
SLAG-A-MELT LAKE	8750	4/28/89	64	24.9	19.7	29.0							
SLIDE ROCK MOUNTAIN	7100	4/26/89	38	14.2	11.8	18.5							
SMUGGLER MINE	6960	5/01/89	16	5.2	3.0	9.9							

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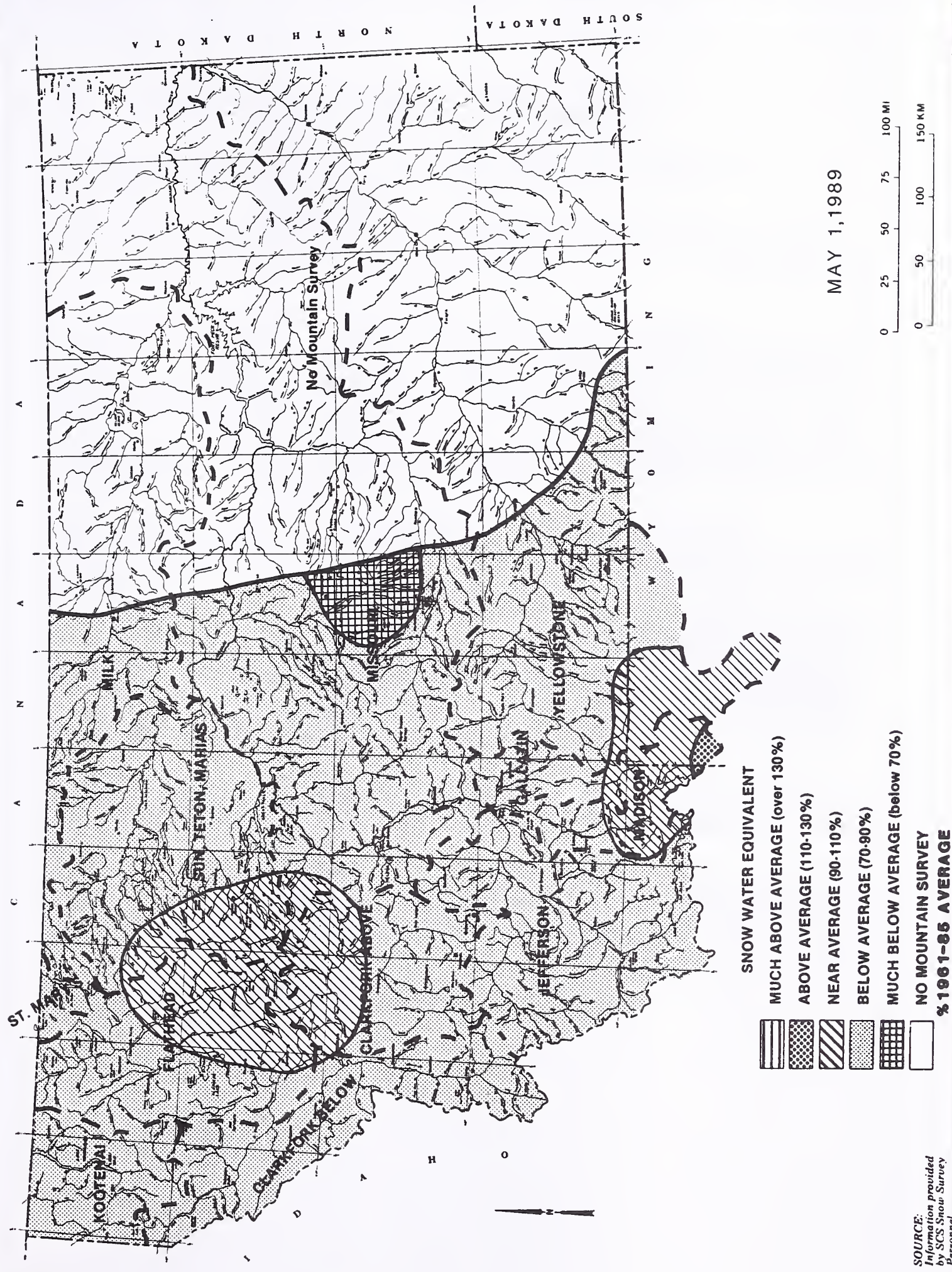


Source: NWS
Great Falls, MT

APRIL 1989



MOUNTAIN SNOWWATER EQUIVALENT FOR MONTANA



May 1, 1989
ESTIMATES OF PEAK SNOWMELT RUNOFF

	<u>Peak Day Range in cfs</u>	<u>1961-85 Avg. cfs</u>
COLUMBIA RIVER		
Blackfoot River near Bonner	6,000 - 9,000	9,588
Clark Fork River above Missoula	12,000 - 16,000	16,738
Bitterroot River near Darby	4,500 - 6,500	6,229
Clark Fork River below Missoula	22,000 - 32,000	31,992
Clark Fork River at St. Regis	24,000 - 35,000	39,984
N. Fk. Flathead near Columbia Falls	15,000 - 21,000	21,189
M. Fk. Flathead near West Glacier	14,000 - 20,000	22,463
MISSOURI RIVER DRAINAGE		
Big Hole River near Melrose	5,000 - 7,000	8,015
Ruby River above Reservoir	500 - 800	1,037
Gallatin River near Gateway	4,000 - 5,000	5,389
Gallatin River near Logan	4,000 - 5,500	5,581
Missouri River at Toston	16,600 - 23,000	19,042
Marias River near Shelby	4,000 - 7,000	11,516
S. Fk. Musselshell above Martinsdale	600 - 900	1,229
YELLOWSTONE RIVER DRAINAGE		
Yellowstone River at Corwin Springs	17,000 - 22,000	17,532
Yellowstone River at Livingston	18,000 - 24,000	20,732
Boulder River near Big Timber	4,500 - 6,500	5,226
Stillwater River near Absarokee	5,000 - 7,000	6,601
Clarks Fork River near Belfry	6,500 - 9,000	7,706
Yellowstone River at Billings	35,000 - 48,000	42,716

Future Status of Water Supply Outlook Report

A recent evaluation of the Snow Survey and Water Supply Forecasting Programs interviewed 200 users of the forecasts. We learned that:

- Users who got their information by accessing our computer were very satisfied
- Users who depended on the monthly Water Supply Outlook Report needed information much earlier in the month.
- The reports contained more information than many users needed.

In summary, we are producing a report that is not doing the job for most users. And we are spending a lot of money on the report.

The state-wide WATER SUPPLY OUTLOOK REPORT will be discontinued. We are proposing three actions for the next water year to better meet your needs:

First: The user's direct access of forecasts via computer will be improved. We will provide better instructions and self-training materials. Also, District Conservationists who have computers will be encouraged to access forecasts and distribute local reports to those users who do not have computer facilities.

Second: The SCS state office will prepare individual forecast reports for the major river basins in the state. They will be the same as the reports available on the computer. Users, who request it, will be on a mailing list to receive one or more of the reports. They will be printed and mailed within a day or two after the basin forecast is completed and available on the computer.

Third: For users who are interested in the forecasts for their historical value rather than for decision- making, an annual summary will be provided. A West-Wide Report will continue to be available, published jointly with the National Weather Service.

This summer and fall will be spent developing the details of these procedures. You will be informed prior to next water year's reports, and new mailing lists will be prepared

Please call or write if you have questions.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

SNOW SURVEY UNIT

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